U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-256 455

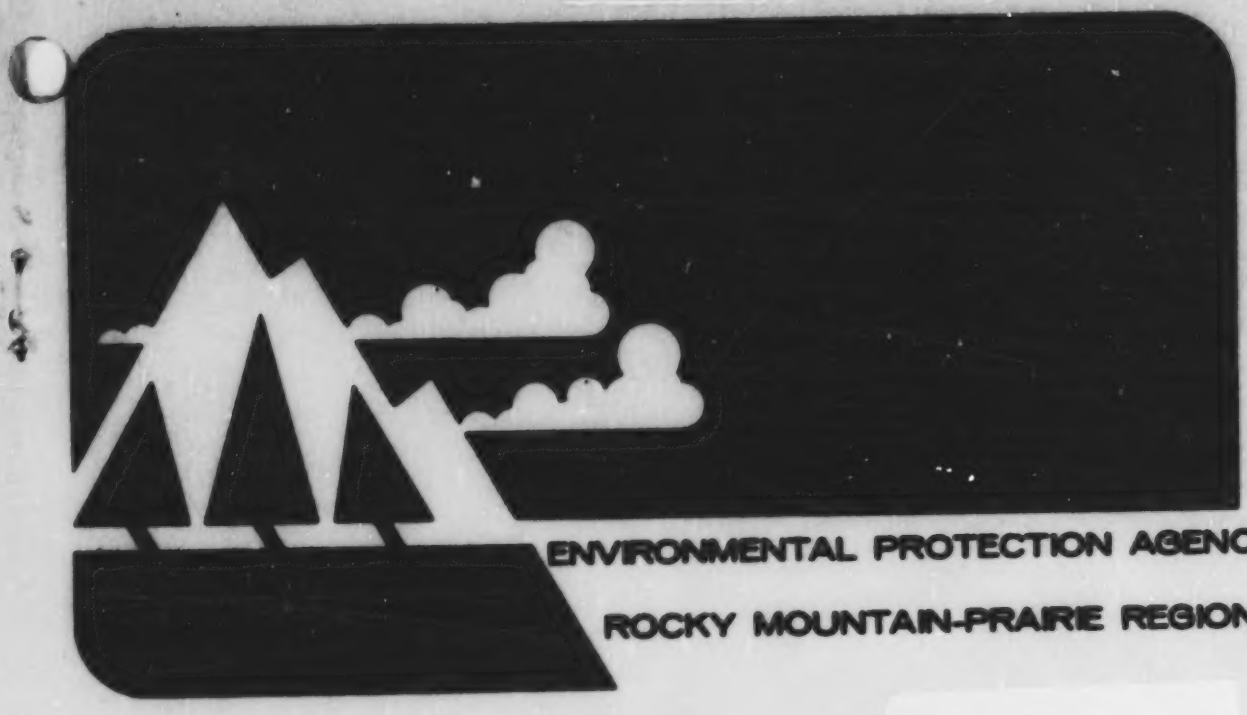
Accomplishment Plan. Region VIII. Comprehensive Energy-Environment Program. Appendix

Environmental Protection Agency

June 1975

215123

PB 256 455



ENVIRONMENTAL PROTECTION AGENCY

ROCKY MOUNTAIN-PRAIRIE REGION

REGION VIII

FY 76 COMPREHENSIVE

ENERGY - ENVIRONMENT PROGRAM

ACCOMPLISHMENT PLAN

APPENDIX

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SPRINGFIELD, VA. 22161

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5. Report Date
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6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Environmental Protection Agency
Denver, Colorado
Region VIII

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered

14.

15. Supplementary Notes
See also PB-256 454.

16. Abstracts
The appendix to a foregoing report on energy and environmental management contains graphic and tabular data on surface water quality monitoring in coal mining and oil shale operations in the Region VIII states, energy resource utilization, and air quality monitoring.

17. Key Words and Document Analysis. 17a. Descriptors
*Regional planning
*Air pollution abatement
*Water pollution abatement
*Coal mining
*Oil shale
*Energy
Project planning
Rocky Mountain Region(United States)
Northern Great Plains Region(United States)
Environmental impacts
Monitoring
Water quality management
Biological surveys
Ground water
Natural resources
Colorado
Montana
North Dakota
South Dakota
Utah
Wyoming

17b. Identifiers/Open-Ended Terms
Air quality maintenance

17c. COSATI Field Group 13B

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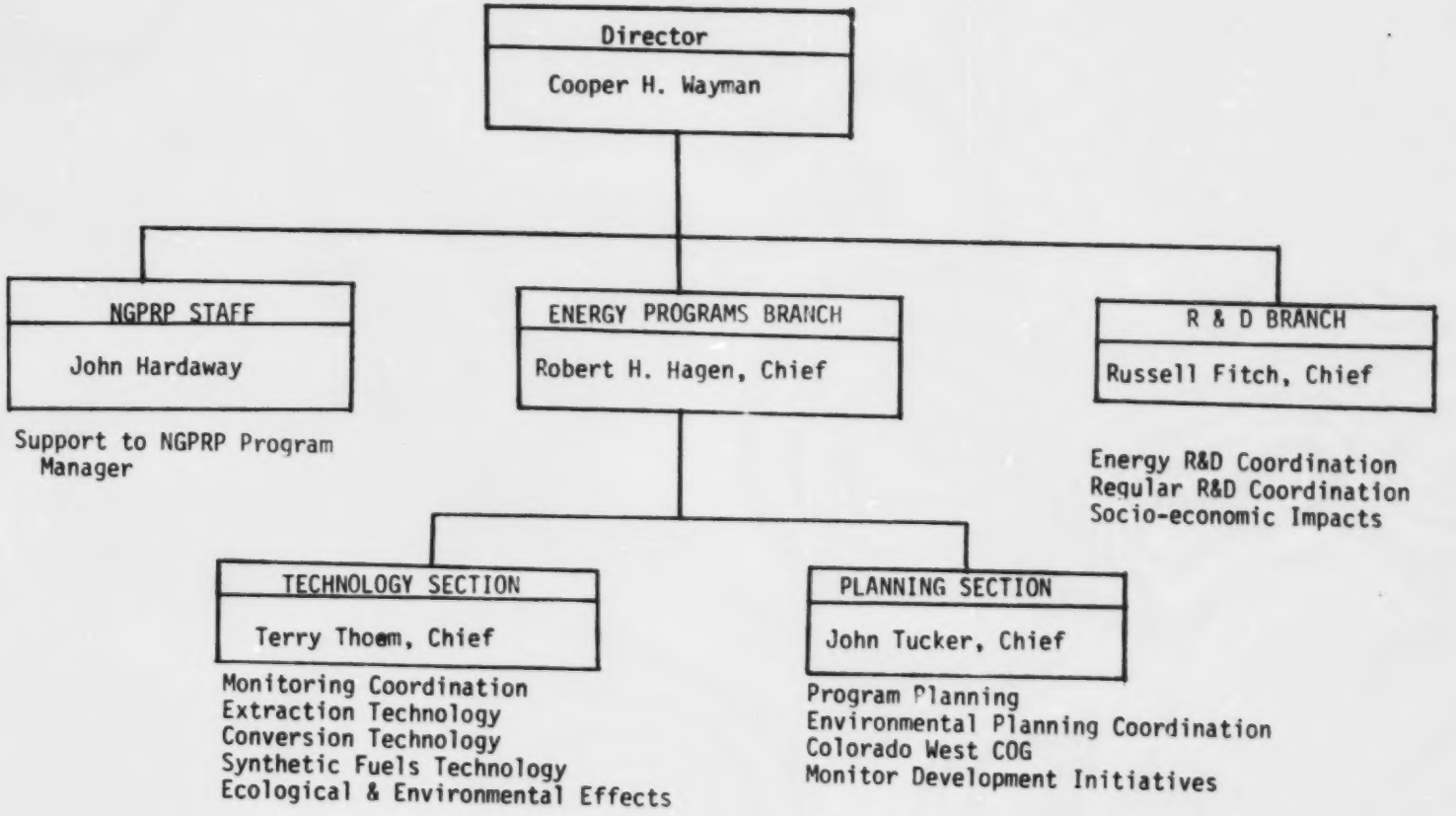
APPENDIX A

ORGANIZATION -

OFFICE OF ENERGY ACTIVITES

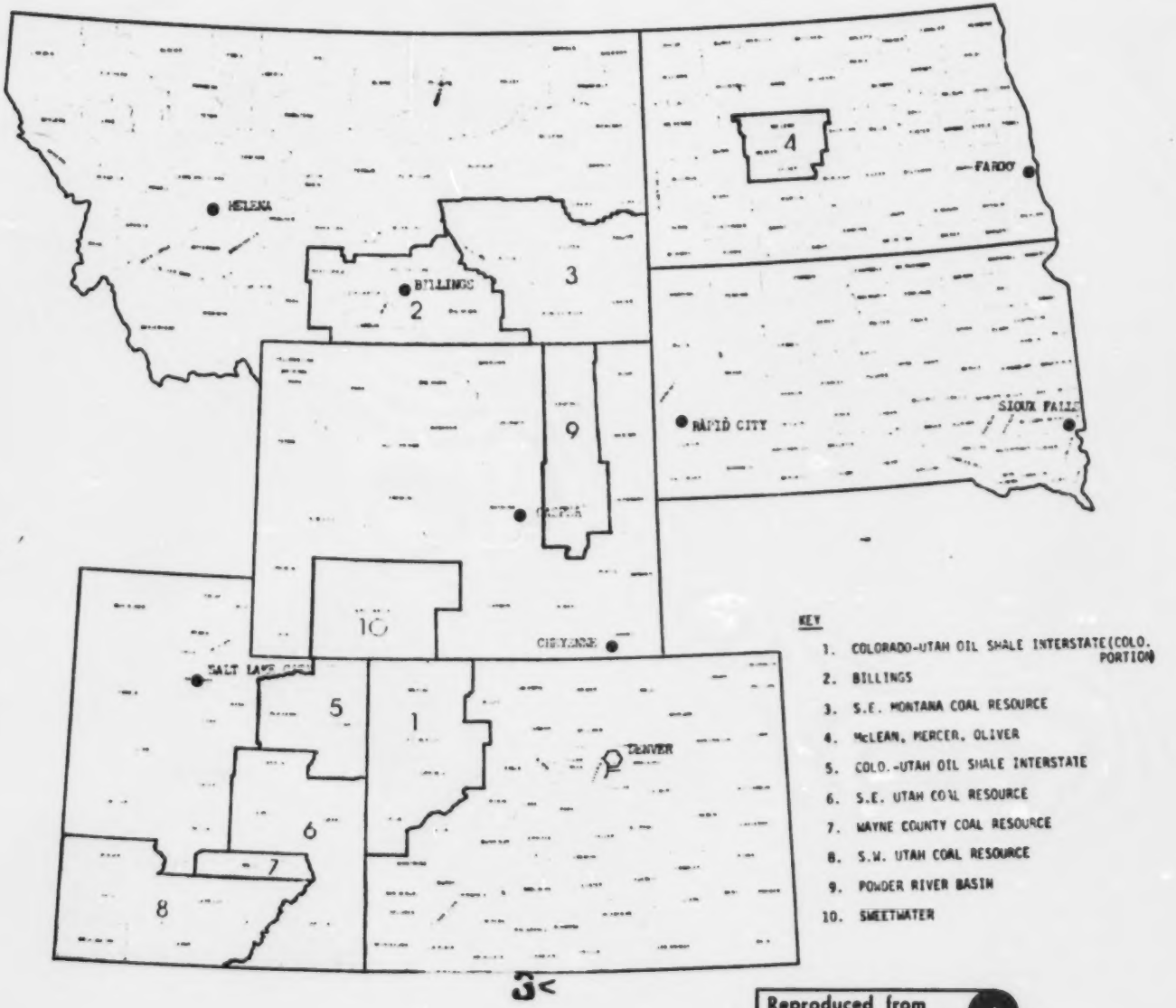
REGION VIII

OFFICE OF ENERGY ACTIVITIES



APPENDIX B

A Q M A - 208 PLANNING AREAS



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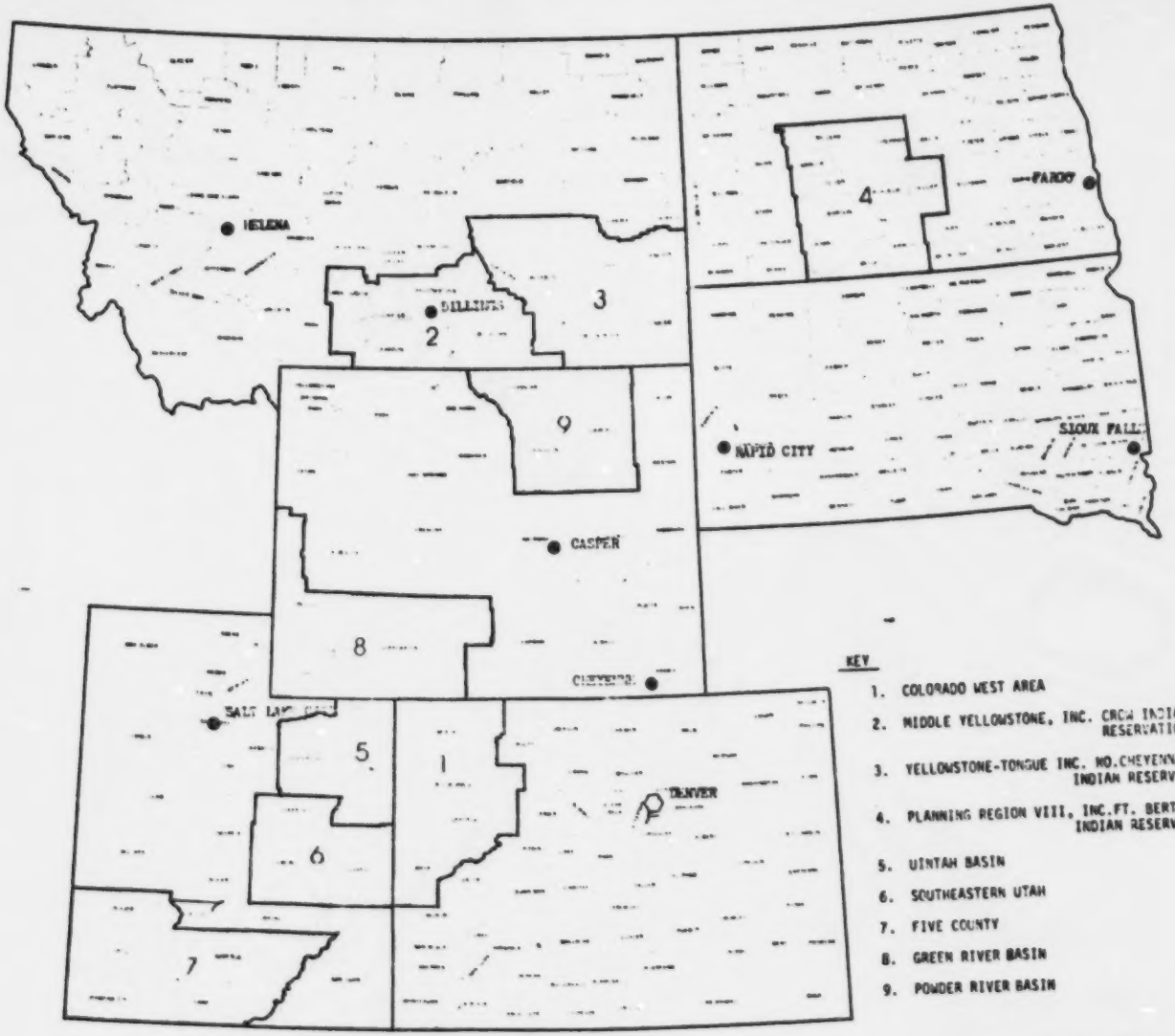
ENERGY AIR QUALITY MAINTENANCE AREAS



KEY

1. COLORADO WEST AREA
2. MIDDLE YELLOWSTONE, INC. CROW INDIAN RESERVATION
3. YELLOWSTONE-TONGUE INC. NO.CHEYENNE INDIAN RESERVATION
4. PLANNING REGION VIII, INC.FT. BERTHOLD INDIAN RESERVATION
5. UINTAH BASIN
6. SOUTHEASTERN UTAH
7. FIVE COUNTY
8. GREEN RIVER BASIN
9. POWDER RIVER BASIN

4c

ENERGY 208 AREAS

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APPENDIX C

ENERGY MONITORING NETWORK

Surface Water Quality Monitoring Program
Oil Shale Resource Areas

(Parametric Coverage)

Field Measurements

- Water Temperature
- Specific Conductance
- pH
- Streamflow
- Dissolved Oxygen
- Odor

Chemical Parameters

- Calcium
- Magnesium
- Sodium
- Potassium
- Chloride
- Sulfate
- Sulfide
- Oil and Grease
- Silica
- Flouride
- Iron
- Bicarbonate
- Carbonate
- Dissolved Solids
- Boron
- Pesticides

Nutrients

- Total Nitrate-Nitrite
- Total Phosphorus
- Total Kieldahl Nitrogen
- Total Ammonia
- Ortho-phosphorus

Metals (Total and Dissolved)

- Arsenic
- Aluminum
- Barium
- Beryllium
- Cadmium
- Cobalt
- Cyanide
- Chromium
- Copper
- Iron
- Lead
- Lithium
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Vanadium
- Zinc

Organic Carbon

Dissolved Organic Carbon (DOC)
Total Organic Carbon (TOC)

Oxygen Demand

Biochemical Oxygen Demand (BOD_5)
Chemical Oxygen Demand (COD)

Physical Parameters

Suspended Sediment
Turbidity
Color

Biological Parameters

Total Coliforms
Fecal Coliforms
Phytoplankton
Periphyton

Surface Water Quality Monitoring Program
Coal Resource Areas

(Parametric Coverage)

Field Measurements

- Water Temperature
- Specific Conductance
- pH
- Streamflow
- Dissolved Oxygen

Chemical Parameters

- Calcium
- Magnesium
- Sodium
- Potassium
- Silica
- Flouride
- Sulfate
- Iron
- Bicarbonate
- Carbonate
- Chloride
- Dissolved Solids
- Boron

Nutrients

- Total Nitrate-Nitrite
- Total Kieldahl Nitrogen
- Total Ammonia
- Total Phosphorus

Metals (Total and Dissolved)

- Arsenic
- Aluminum
- Beryllium
- Cadmium
- Chromium
- Copper
- Iron
- Zinc
- Lead
- Lithium
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Vanadium

Organic Carbon

Dissolved Organic Carbon (DOC)
Total Organic Carbon (TOC)

Oxygen Demand

Biochemical Oxygen Demand (BOD_5)

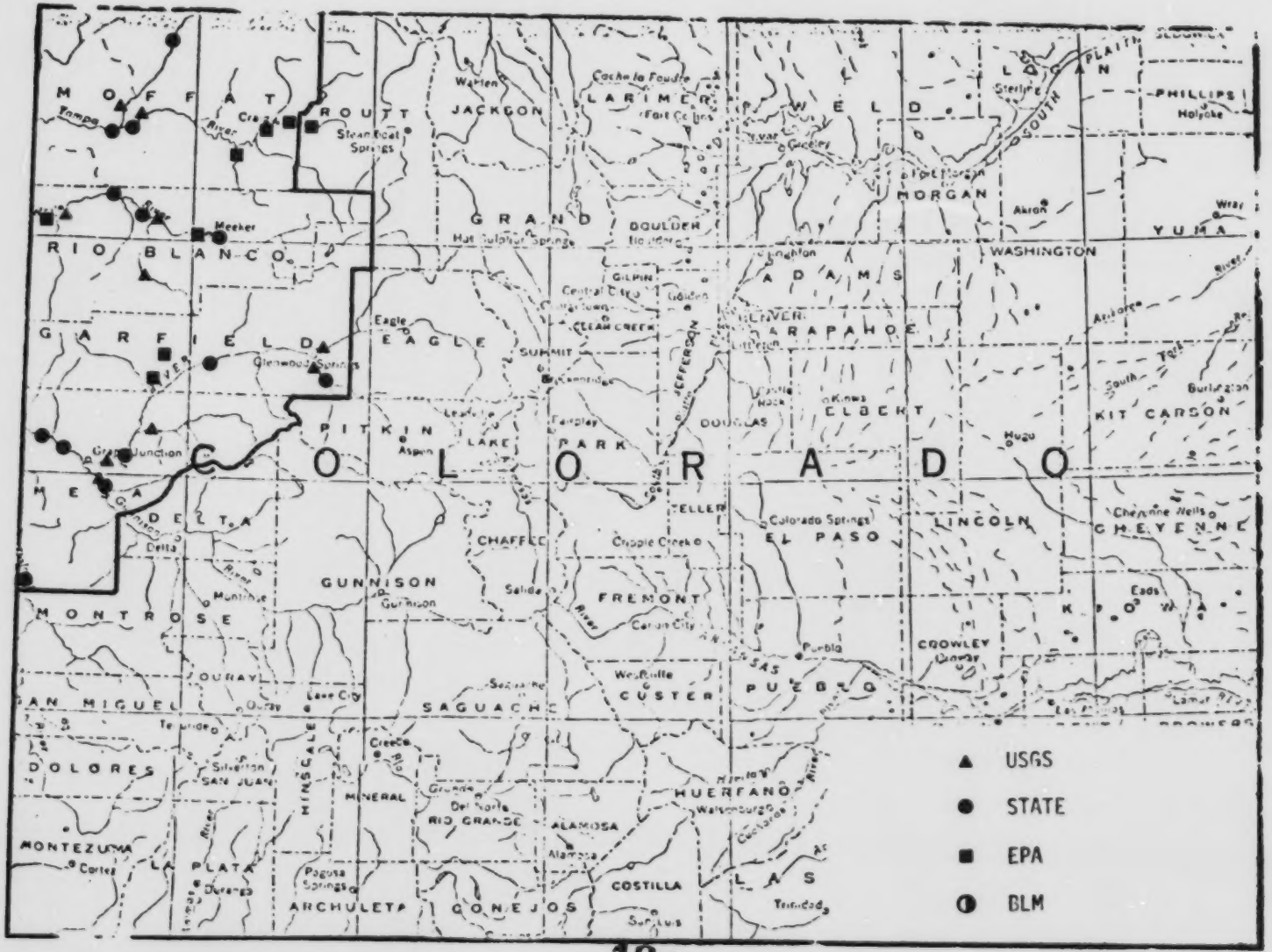
Physical Parameters

Suspended Sediment
Turbidity

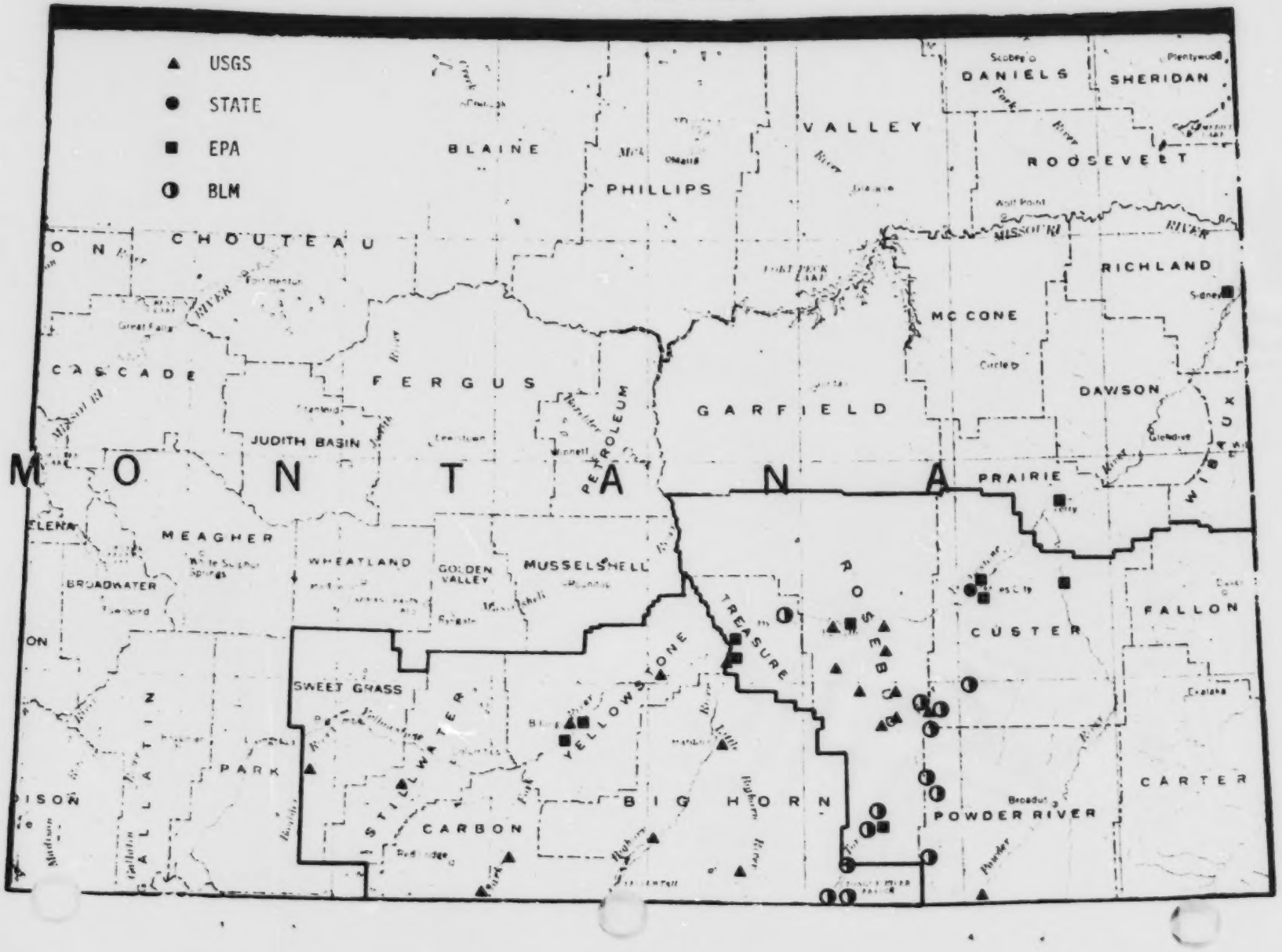
Biological Parameters

Phytoplankton
Periphyton

SURFACE WATER QUALITY MONITORING
ENERGY RESOURCE AREAS



SURFACE WATER QUALITY MONITORING
ENERGY RESOURCE AREAS



SURFACE WATER QUALITY MONITORING
ENERGY RESOURCE AREAS

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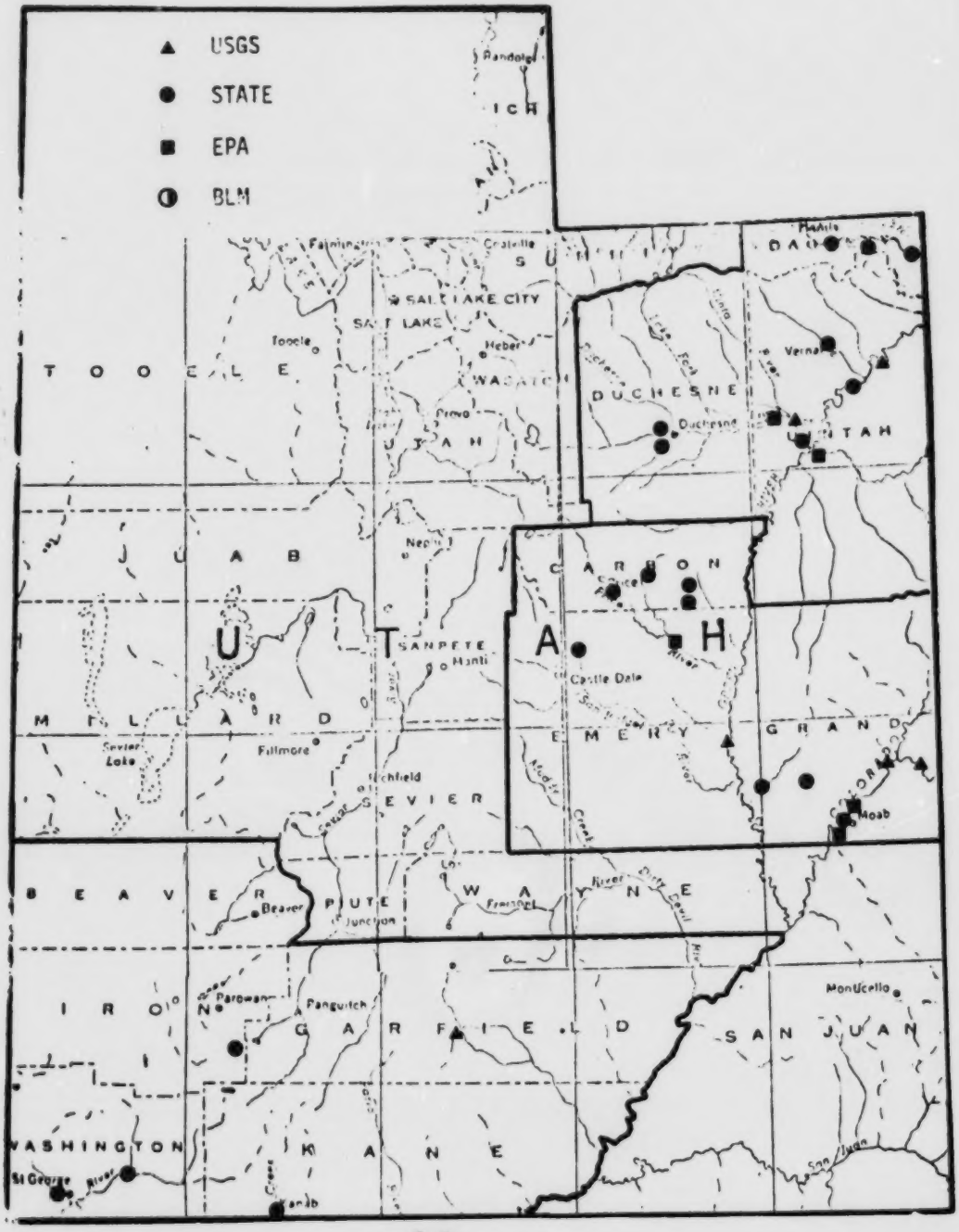
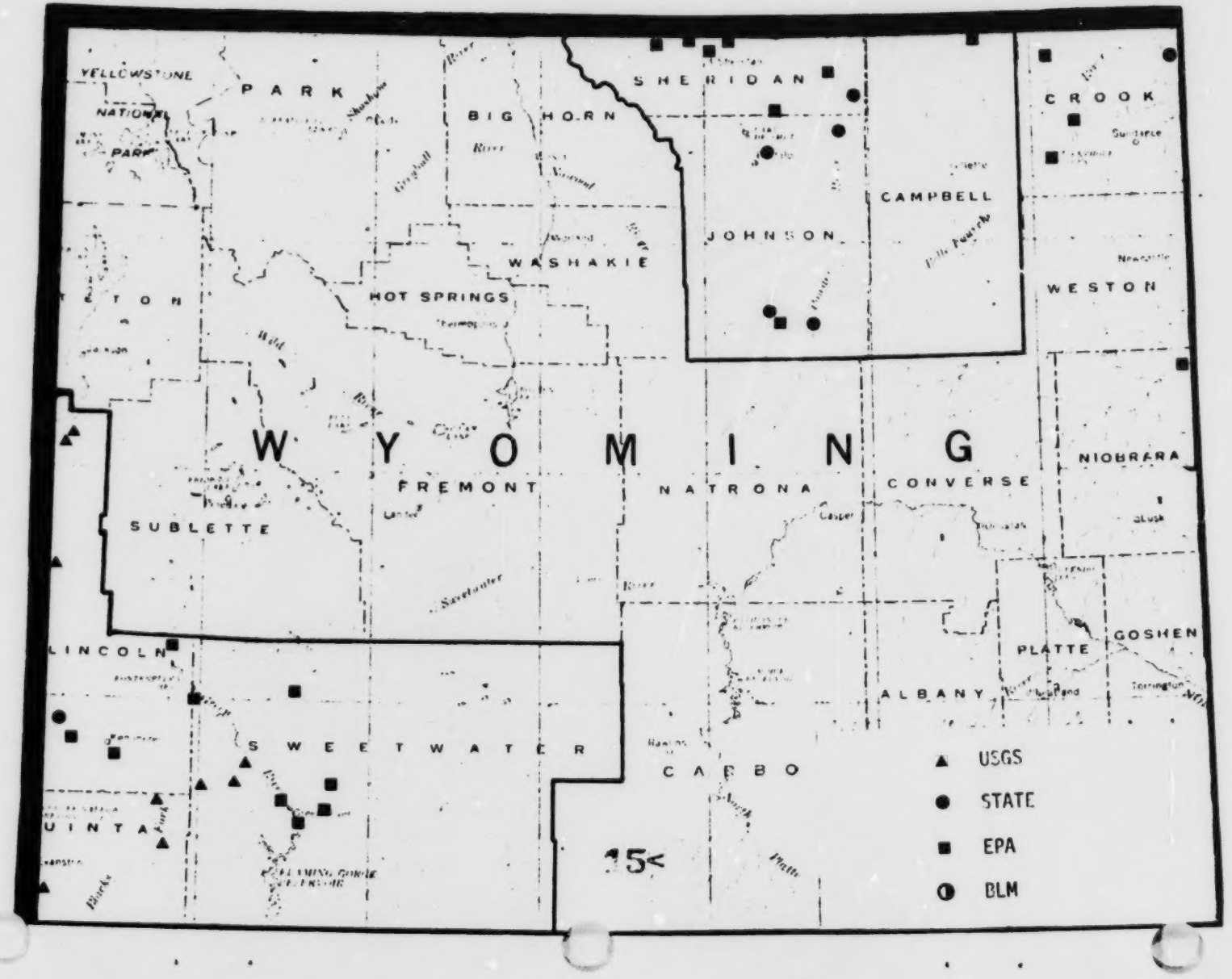
SURFACE WATER QUALITY MONITORING
ENERGY RESOURCE AREAS

SURFACE WATER QUALITY MONITORING
ENERGY RESOURCE AREAS



SURFACE WATER QUALITY MONITORING
ENERGY RESOURCE AREAS

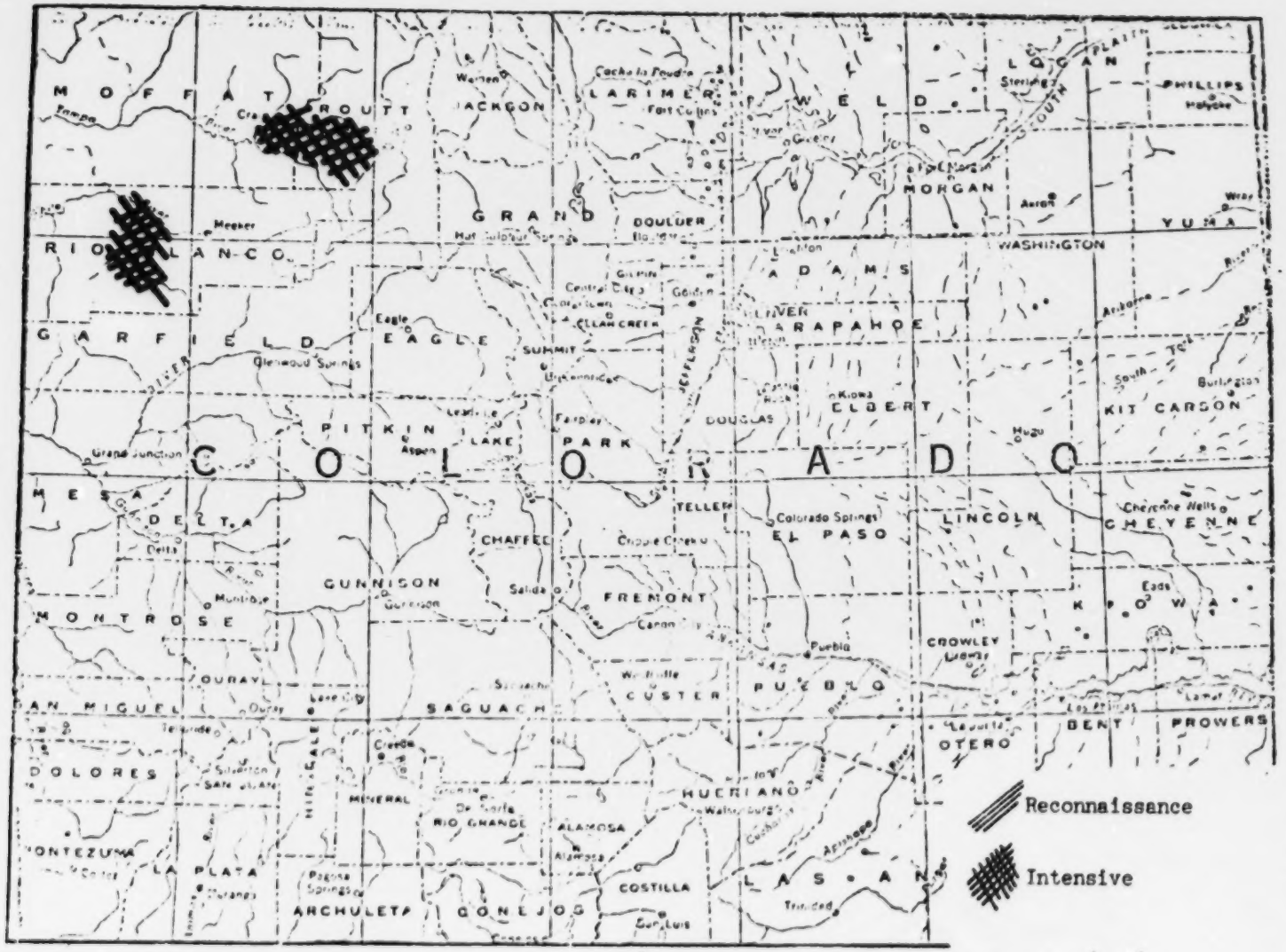


AQUATIC BIOLOGICAL INVESTIGATIONS
ENERGY RESOURCE AREAS

AQUATIC BIOLOGICAL INVESTIGATIONS
ENERGY RESOURCE AREAS

Components of Biological Study and Monitoring Programs

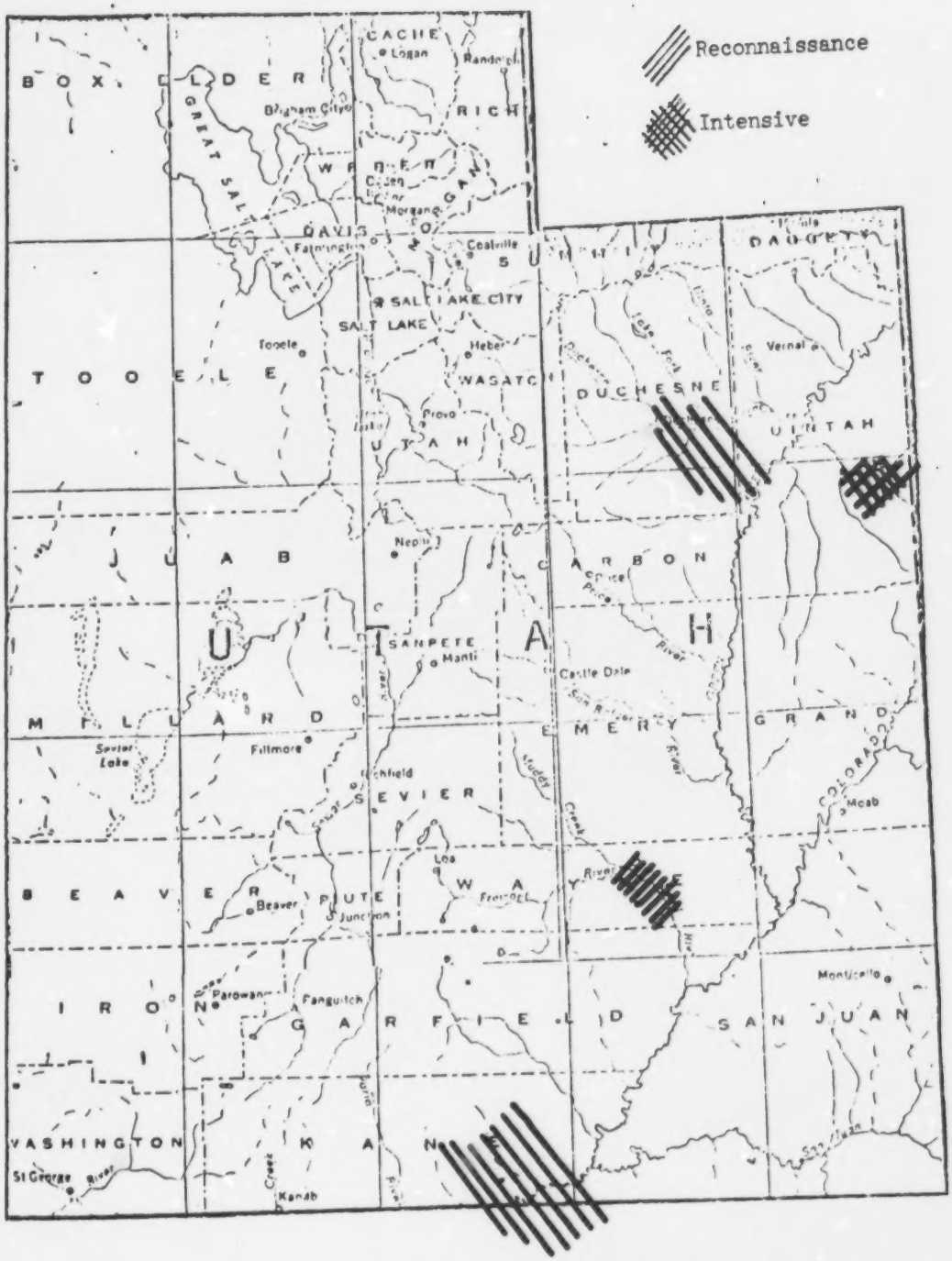
- Algal Studies
  - Phytoplankton
    - Qualitative
    - Quantitative
    - Chlorophyll
  - Periphyton
    - Qualitative
    - Quantitative
    - Chlorophyll
- Benthic Studies
  - Qualitative
  - Quantitative
- Fishery Surveys
  - Abundance
  - Distribution
  - Species Composition
  - Tissue Analysis
- Water and Sediment Chemistry



GROUND WATER MONITORING STATIONS

GROUND WATER MONITORING STATIONS

GROUND WATER MONITORING STATIONS



GROUND WATER MONITORING STATIONS

GROUND WATER MONITORING STATIONS

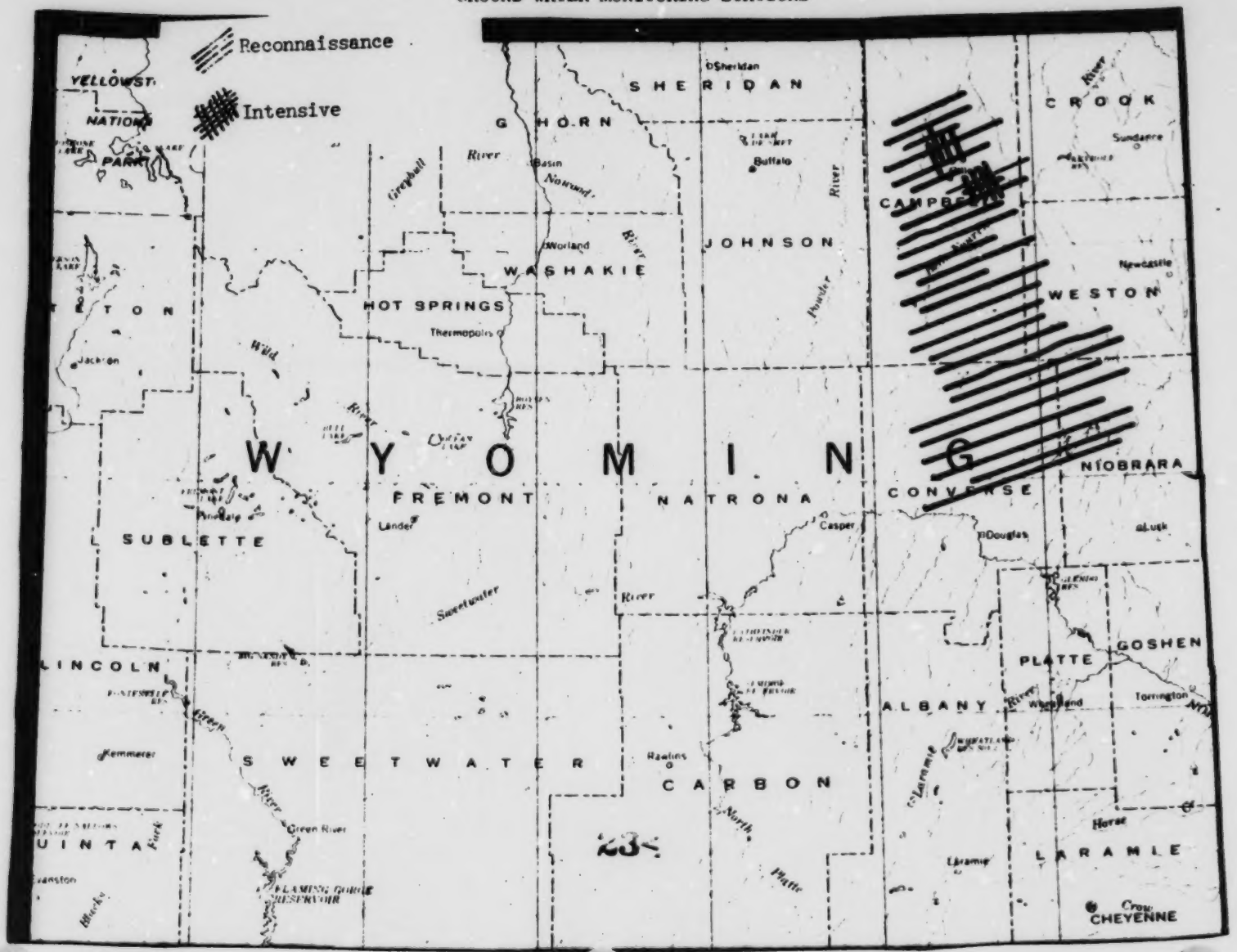
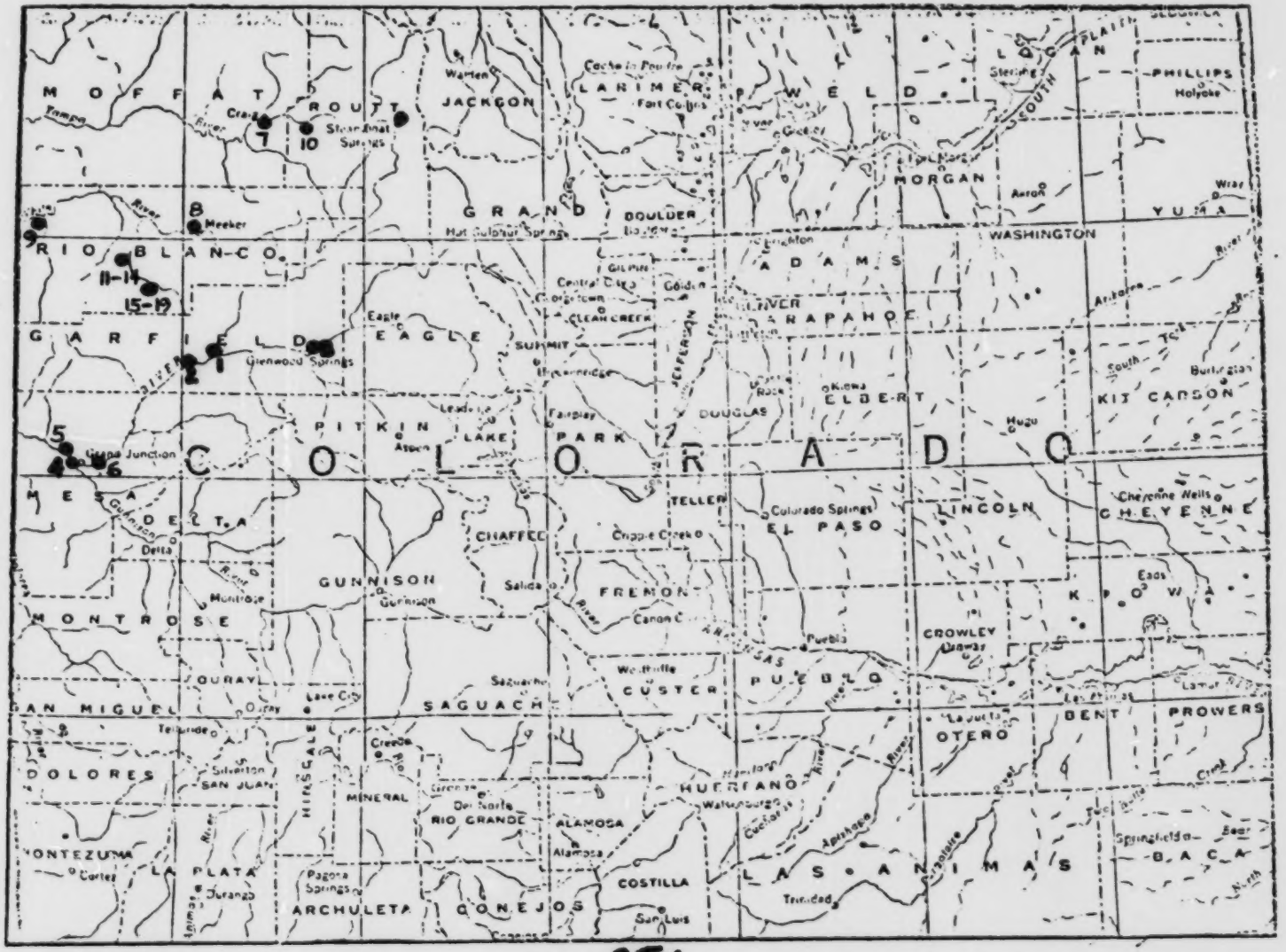


TABLE 7

Groundwater Parameters

1. Total Dissolved Solids	2. Alkalinity
3. Dissolved Silica	4. Dissolved Aluminum
5. Dissolved Iron	6. Dissolved Manganese
7. Dissolved Calcium	8. Dissolved Magnesium
9. Dissolved Sodium	10. Dissolved Potassium
11. Bicarbonate	12. Carbonate
13. Dissolved Sulfate	14. Dissolved Chloride
15. Dissolved Fluoride	16. Dissolved Bromide
17. Dissolved Nitrite and Nitrate	18. Dissolved Ortho-Phosphorus
19. Dissolved Barium	20. Dissolved Boron
21. Dissolved Lead	22. Dissolved Lithium
23. Dissolved Molybdenum	24. Dissolved Selenium
25. Dissolved Strontium	26. pH
27. Carbon Dioxide	28. Dissolved Arsenic
29. Dissolved Copper	30. Dissolved Cadmium
31. Dissolved Mercury	32. Dissolved Zinc
33. Total Alpha Activity	34. Total Beta Activity
35. Total Coliform	36. Fecal Coliform
37. Micro- and Macro-Invertebrate Analysis	38. Phytoplankton
39. Periphyton	



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AIR MONITORING STATIONS

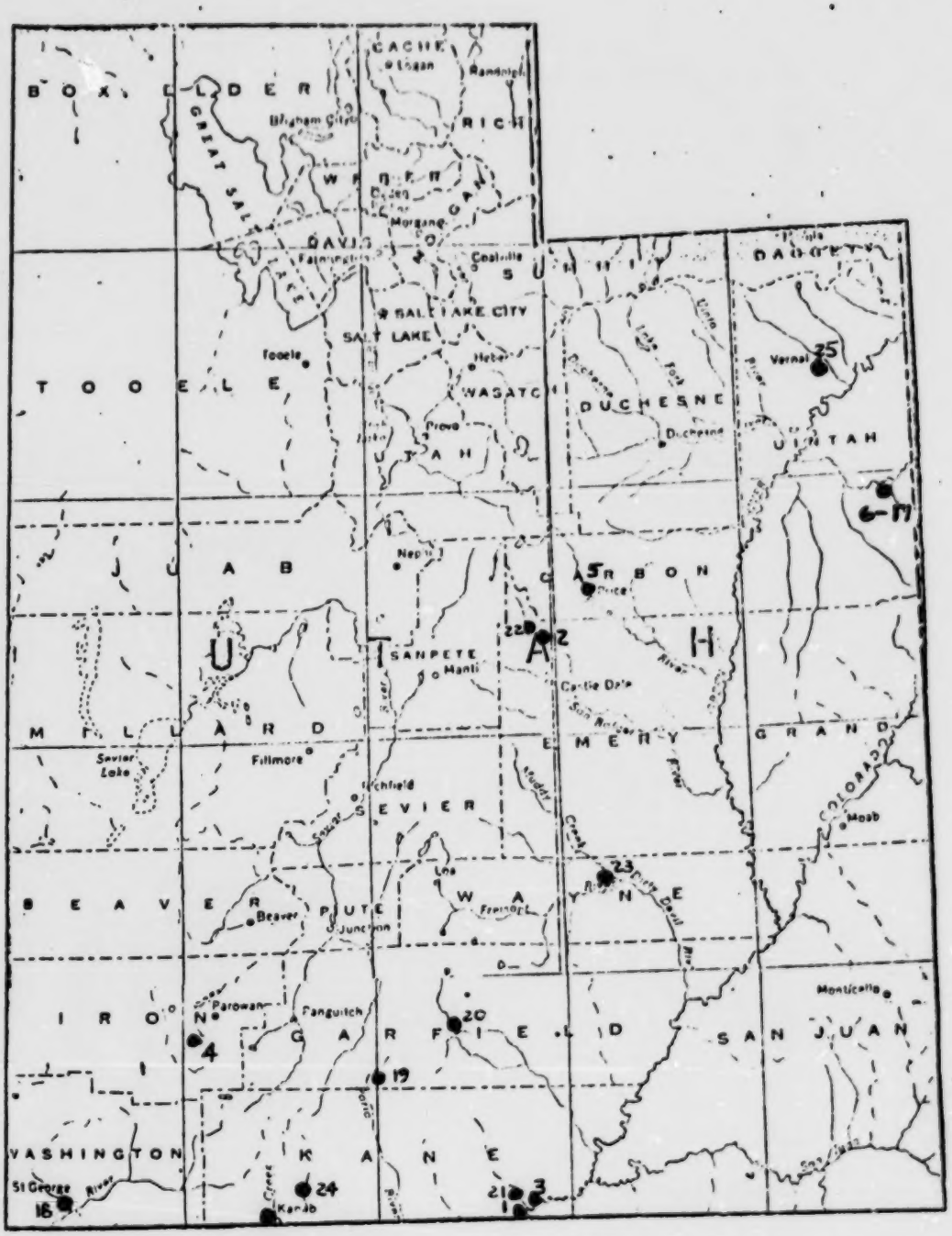
AIR MONITORING STATIONS

AIR MONITORING STATIONS

DIVIDE
BURKE
BOTTINEAU
ROLETTE
CAVALIER
PEMBINA
WILLIAMS
TOWNER
PIERCE
RAMSEY
WALSH
MOUNTRAIL
WARD
MC HENRY
BENSON
NELSON
GRAND FORKS
MC KENZIE
MC LEAN
SHERIDAN
EDDY
NORTH DAKOTA
DUNN
MERCER
WELLS
FOSTER
GRIGGS
STEELE
TRAIL
BILLINGS
OLIVER
KIDDER
STUTSMAN
BURLEIGH
BISMARCK
CASS
STARK
MORTON
BARNES
SLOPE
HETTINGER
GRANT
EMMONS
LOGAN
LA MOURE
RANSOM
RICHLAND
BOWMAN
ADAMS
MC INTOSH
DICKEY
SARGENT
Crosby
Bowbells
Mohall
Bottineau
Cavalier
Langdon
Towner
Rugby
Minot
Stanley
Williston
Watford City
Devils Lake
Lakota
Minnewaukan
Grand Forks
Fessenden
New Rockford
Mc Clusky
Carrington
Cooperstown
Finley
Hillsboro
Washburn
Stanton
Manning
Knife River
Center
Dickinson
Medora
Mandan
Bismarck
Steele
Jamestown
Valley City
Fargo
Amidon
Carson
Napoleon
Lisbon
Wahpeton
Bowman
Hettinger
Cedar Creek
Cannonball River
Fort Yates
Linton
Ashley
Ellendale
Forman
Missouri River
Yellowstone River
Little Missouri River
Sheyenne River
James River
Red River
Lake Sakakawea
Lake Audubon
Lake Tschida
Lake Ashtabula
Devils Lake
Sheyenne Lake
Jamestown Reservoir
Heart River
Green River
Knife River
Little Missouri River
Cannonball River
Cedar Creek
Missouri River
Yellowstone

AIR MONITORING STATIONS

AIR MONITORING STATIONS



AIR MONITORING STATIONS

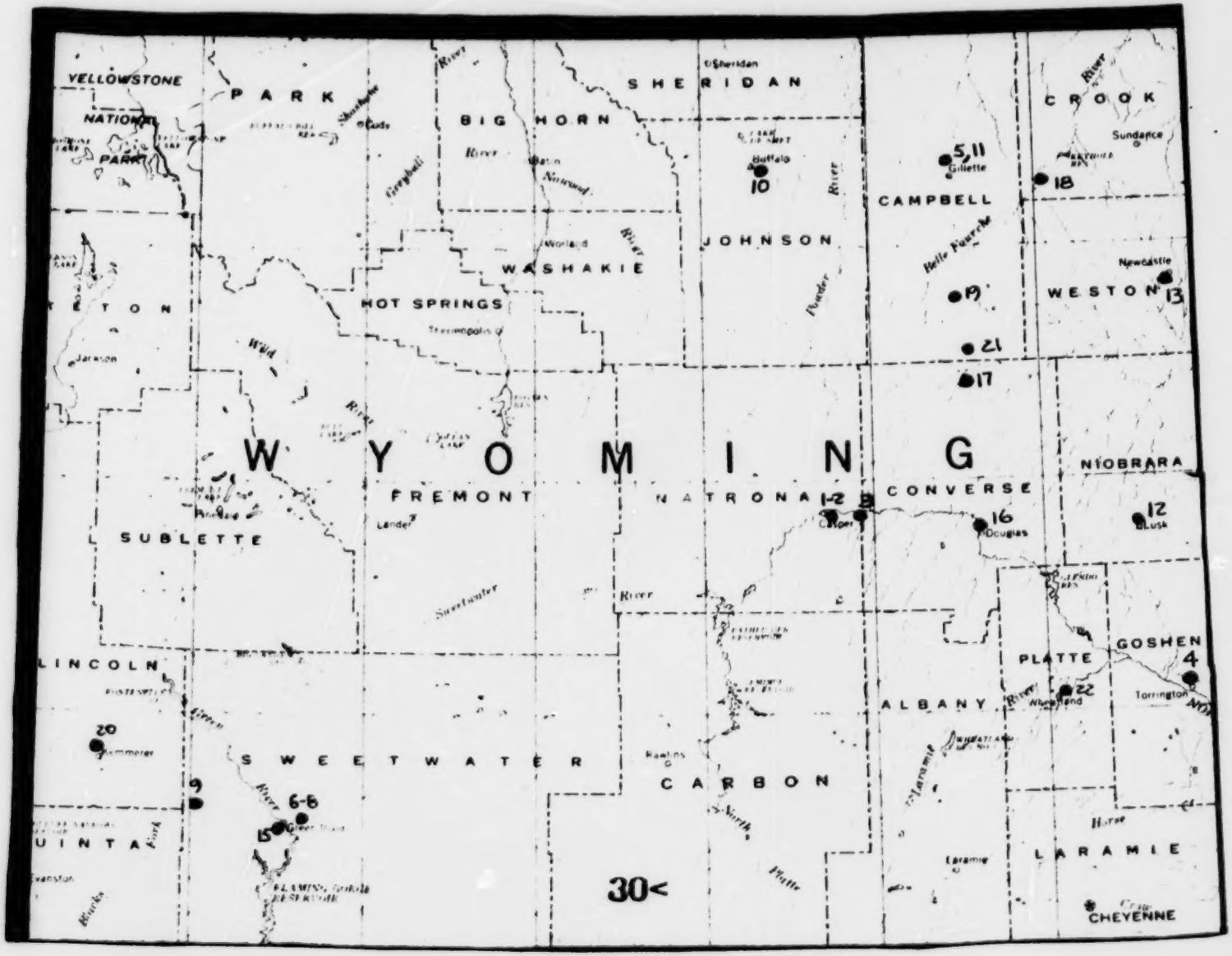


TABLE 1

Air Quality Monitoring Stations
Energy Areas -- Colorado

Station I. D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
060880001F01	Rifle	C-1	X					
060880003F01	Grand Valley	C-2	X					
060920001F01	Glenwood Springs	C-3	X					
060980009F01	Grand Junction	C-4	X					
061520001F01	Fruita	C-5	X					
061520002F01	Palisade	C-6	X					
060480001F01	Craig	C-7	X					
061860001F01	Meeker	C-8	X					
061860002F01	Rangely	C-9	X					
061920001F01	Hayden	C-10	X					
	C-a tract	C-11	X	X	X	X	X	X
	C-a tract	C-12	X	X			X	
	C-a tract	C-13	X	X	X	X	X	X
	C-a tract	C-14	X	X			X	
	C-b tract	C-15	X	X	X	X	X	X
	C-b tract	C-16	X	X				
	C-b tract	C-17	X	X				
	C-b tract	C-18	X	X	X	X	X	X
	C-b tract	C-19	X	X				

TABLE 2

Air Quality Monitoring Stations
Energy Areas -- Montana

Station I.D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
270060008F03	Billings	M-1	X					
270080005G01	Billings	M-2	X					
270080006G02	Billings	M-3	X					
270080007G01	Billings	M-4	X					
270080008G01	Billings	M-5	X					
270080009G01	Billings	M-6	X					
270080001G02	Laurel	M-7	X					
271360027F03	Rosebud Co	M-8	X					
271360028F03	McRae	M-9	X	X				
271240008P03	Ft. Howes	M-10	X					
271360026P03	Ashland	M-11	X	X	X			
270200001P03	Ekalaka	M-12	X					
270360001P03	Glendive	M-13	X					
270360002P03	Lindsay	M-14	X					
270980001P03	Ft. Peck	M-15	X	X	X			
271240009P03	Broadus	M-16	X					
271340001P03	Poplar	M-17	X					
	Colstrip	M-18	X	X	X	X	X	X
	Colstrip	M-19	X	X	X			
	Colstrip	M-20		X	X	X	X	X
	Decker	M-21	X					
	Hardin	M-22	X					
	Miles City	M-23	X					
	Scobey	M-24	X	X	X			
	Wolf Point	M-25						

TABLE 3

Air Quality Monitoring Stations
Energy Areas -- North Dakota

Station I.D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
350100001F01	Bismarck	ND-1	X					
350100001P01	Bismarck	ND-2	X	X				
350740001F01	Mandan	ND-3	X					
350760001F01	Beulah	ND-4	X	X				
	Parshall	ND-5	X					
	Garrison	ND-6	X					
	Washburn	ND-7	X	X	X			
	McClusky	ND-8	X					
	Bowman	ND-9	X					
	Stanton	ND-10	X	X	X			X
	Mott	ND-11	X	X	X			
	Medora	ND-12	X					

TABLE 4

Air Quality Monitoring Stations
Energy Areas -- South Dakota

Station I.D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
431380001F01	Rapid City	SD-1	X	X				
431380002F01	Rapid City	SD-2	X	X				
430110001P03	Black Hills	SD-3	X	X				
	Belle Fourche	SD-4	X					
	Buffalo	SD-5	X					
	Lemmon	SD-6	X					
	Rapid City	SD-7	X					
	Rapid City	SD-8	X					
	Spearfish	SD-9	X					
	Lead	SD-10	X					
	Hot Springs	SD-11	X					
	Deerfield	SD-12	X					

TABLE 5

Air Quality Monitoring Stations
Energy Areas -- Utah

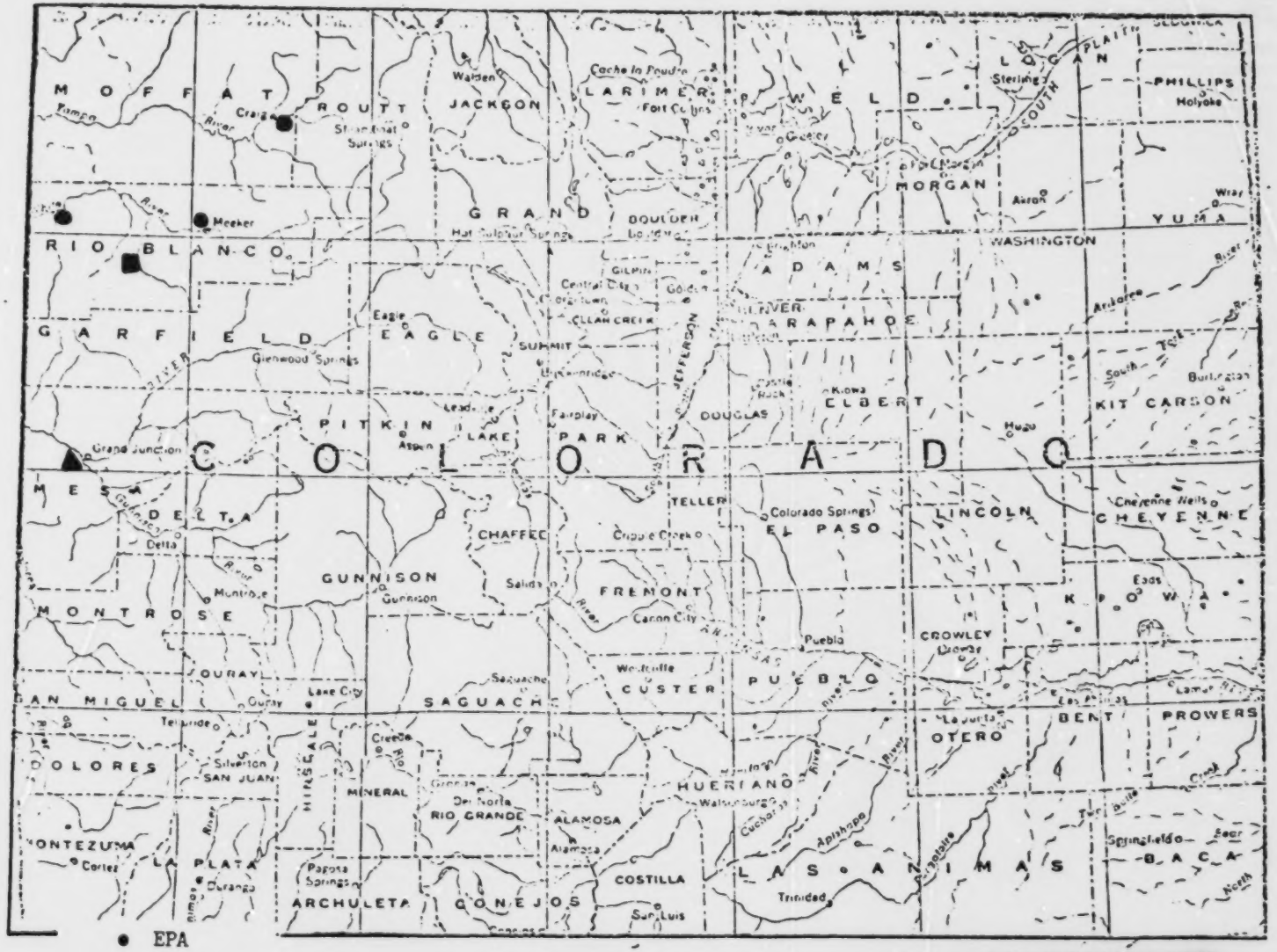
Station I. D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
460400002F03	Wahweap	U-1	X	X				
460280003P03	Huntington	U-2	X	X				
	Bullfrog Basin	U-3	X					
	Cedar City	U-4	X	X				
	Price	U-5	X	X				
	U-a tract	U-6	X	X				
	Ua	U-7	X	X	X	X	X	X
	Ua tract	U-8	X	X	X	X	X	X
	Ua tract	U-9	X	X				
	U-b tract	U-10	X	X				
	Ub tract	U-11	X	X	X	X	X	X
	Ub tract	U-12	X	X				
	Ub tract	U-13	X	X				
	Ua	U-14	X	X				
	Ua	U-15	X	X				
	Ub	U-16	X	X				
	Ub	U-17	X	X				
461280002K03	St. George	U-18	X	X				
460400004K03	Henrieville	U-19	X					
460300002K03	Escalante	U-20	X	X				
460400004K03	Glen Canyon City	U-21	X					
460280001K03	Emery County	U-22	X	X				

Station I. D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
	Caineville	U-23	X	X				
	Kanab	U-24	X	X				
	Vernal	U-25	X					

TABLE 6

Air Quality Monitoring Stations
Energy Areas -- Wyoming

Station I. D.	Location	Code	Part.	SO_2	NO_x	CO	HC	O_3
520120001P01	Casper	W-1	X	X				
520120001F01	Casper	W-2		X				
520180001F03	Burks Ranch	W-3	X					
520760001F01	Torrington	W-4	X					
520280001F01	Gillette	W-5	X					
520620001F01	Rock Springs	W-6	X	X				
	Rock Springs	W-7	X					
	Rock Springs	W-8	X					
520700001F01	Granger	W-9	X					
	Buffalo	W-10						
	Gillette	W-11	X	X	X			
	Lusk	W-12						
	Newcastle	W-13						
	Afton	W-14						
	Green River	W-15						
	Douglas	W-16						
	Bill	W-17						
	Moorcroft	W-18						
	Reno Junction	W-19						
	Kemmerer	W-20						
	So. Campbell Co	W-21						
	Wheatland	W-22						



● EPA
▲ NWS
■ Industry

● UPPER AIR METEOROLOGICAL SITES

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• UPPER AIR METEOROLOGICAL SITES

● UPPER AIR METEOROLOGICAL SITES

SOUTH DAKOTA
HARDING
PERKINS
CORSON
CAMPBELL
MC PHERSON
MARSHALL
BROWN
ROBERTS
BUTTE
DEWEY
ZIEBACH
POTTER
FAULK
SPINK
DAY
GRANT
CODINGTON
DEUEL
CLARK
HAMLIN
MEADE
SULLY
HYDE
HAND
PENNINGTON
HAAKON
STANLEY
PIERRE
HUGHES
BEADLE
KINGSBURY
BROOKINGS
BUFFALO
JERAULD
SANBORN
MINER
LAKE
MOODY
JACKSON
JONES
LYMAN
CUSTER
BRULE
AURORA
DAVISON
HANSON
MC COOK
MINNEHAHA
WASHABAUGH
MELLETTE
DOUGLAS
MUTCHINSON
TURNER
LINCOLN
SHANNON
BENNETT
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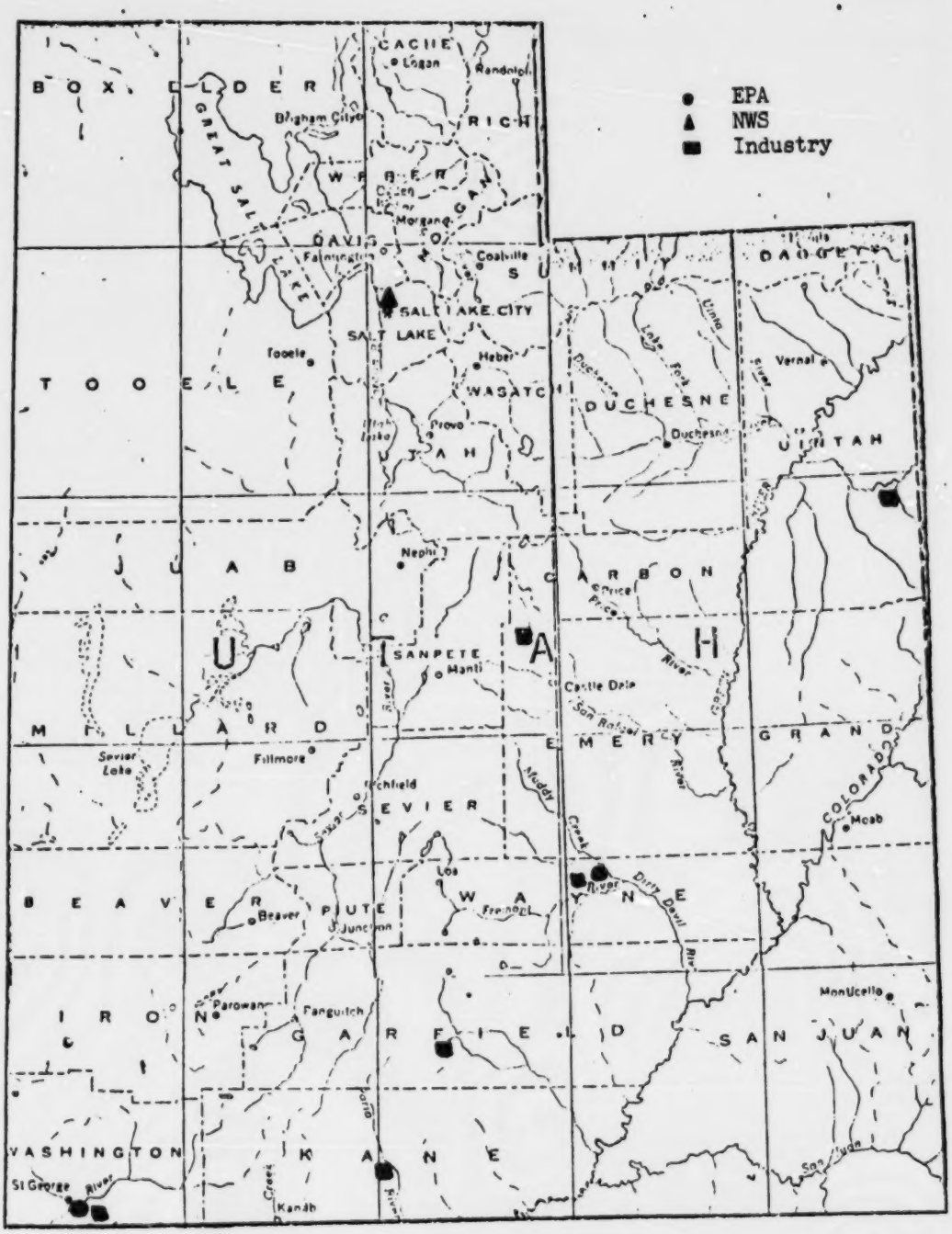
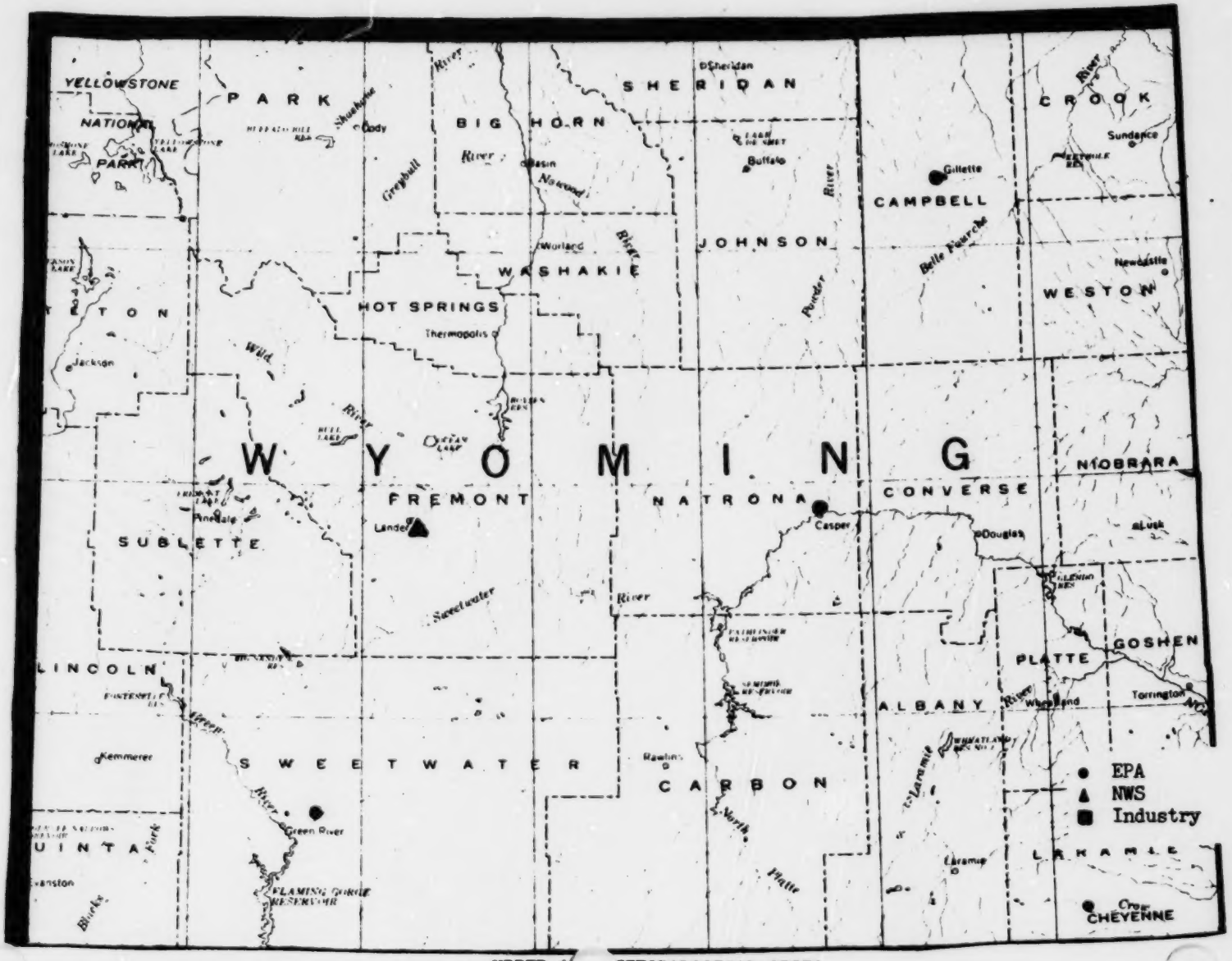


• UPPER AIR METEOROLOGICAL SITES



• UPPER A[illegible]ETEOROLOGICAL SITES

APPENDIX D

FY'74-75 CONTRACTS SUMMARY

S U M M A R Y

NGPRP FY'74 CONTRACTS

CONTRACT	$ AMOUNT	STATUS
Impact of Strip Mining on Ground Water	25,000	Report released Oct. 1974
Surface Water Quality	41,000	Network Operational
Instream Needs	46,000	Phase I Report released 10/74 Phase II field testing underway
Surface Water Trace Element Analysis	11,000	Sampling initiated; 75% complete
Soil/Sediment/Water Analysis for Selected Elements	28,000	Equipment obtained
Erosion & Sedimentation Models	2,500	Complete
Power Plant Trace Element Mass-Balance	157,000	Project completed
Temperature Soundings	82,000	Sampling began June 1, 1975
Pilot Balloon Observations	64,000	Sampling began June 1, 1975
Wind Tower Data	25,000	Operational, December, 1974
Wind Data Reduction	10,000	Work underway September, 1974
NGPRP Air Quality Network	187,000	Network operational Sept., 1974
Trace Element Analysis of TSP Samples	36,000	In progress; 25% complete
Alternatives to Coal Development in NGP	25,000	90% complete; 2 workshops held; draft report in preparation
Leaching of Overburden from Coal Mines	2,500	Final report received
Aerial Inventory of Coal Mine Areas	9,000	Photo data received
Impacts of Oil Shale Development on Colorado Resources	4,300	Final draft report received

STATUS OF FY'75 PROJECTS

July 1, 1975

Reference No.	Description	Amount	Source	Status
1a	Collect detailed physical, chemical and selected biological data from the surface waters of the Yampa and Williams Fork Rivers that may be impacted by coal mining, conversion, and use. - CO	$ 16,606	IAA-USGS	System in operation
1b	Collect detailed baseline data from surface waters of the White River, Parachute Creek and Logan Wash oil shale areas. - CO	22,602	IAA-USGS	"
2a(1)	Collection and analysis of baseline surface water quality at selected stations on the Yellowstone and Tongue Rivers.- MT	23,960	IAA-USGS	"
2a(2)	Biological sampling and analysis of surface waters at selected stations on the Yellowstone and Tongue Rivers. - MT	4,030	IAA-USGS	"
3a	Collection and analysis of surface water quality data at selected stations on the Missouri River, Knife River, and Spring Creek.- ND	24,390	IAA-USGS	"
4a	Collect and Analyze Water Quality Data in the Energy Impacted Areas of Utah.	17,940	IAA-USGS	"
5a	Water Quality Sampling and Analysis of Surface Waters in the Energy Areas of the Green River and Powder River Basins. - WY	60,970	IAA-USGS	"
5b(1)	Continue the Surface Water Quality Monitoring Program Established in 1974 in the Powder River Coal Region. - WY	23,470	IAA-USGS	"
5b(2)	Collecting and Analyzing Biological Data in the Powder River Coal Region.- WY	4,000	IAA-USGS	"

STATUS OF FY'75 PROJECTS

Reference No.	Description	Amount	Source	Status
6a	Aquatic-terrestrial ecosystem study in the White River drainage. - CO	$ 25,000	IAA-USBR	ORN Approved
6b	DNR minimum flow study in the Yampa River drainage by the Health Dept.- CO	30,000	104 Grant-State	Grant to be awarded 8/75
7a	Collection of baseline water quality and ecosystem data on the Poplar River to monitor the impacts of Canadian coal development. _ MT	19,695	104 Grant-State	Grant Awarded
7c	Fishery habitat, distribution, and spawning study - MT	8,279	104 Grant-State	Grant Awarded
8a,b,c	Collect baseline biological data on the Cannonball, Knife and Little Missouri Rivers to complement fishery investigations by State Game & Fish. _ ND	2,500 2,500 2,500	P.O. P.O. P.O.	ORN Approved
9a	Provide support to USFW in the field validation of an instream needs model for cold water fisheries in the Uintah Basin of Utah with general applicability to all cold water habitats in the region.	25,000	IAA-USFW	IAA Signed
11a	Continue air quality monitoring, collect baseline particulate, SO_2, and NO_x air quality data in Mesa, Rio Blanco & Moffat Counties. - CO	20,000	103 Grant-State	Grant to be awarded 8/75

STATUS OF FY'75 PROJECTS

Reference No.	Description	Amount	Source	Status
12a, 13a, 14a, 16a	Continuation of an FY'74 contract with PEDCO for air quality monitoring.	$ 52,000	PEDCO	Funds Transferred to Durham
12b	Continue operation of the present air quality monitoring network and expanding network by 4 additional particulate monitors - MT	43,000	103 Grant-State	Grant Awarded
13b	Continue operation of present air quality monitoring network plus expand network by HC and O_3 continuous monitor through 6/76 - ND	50,000	103 Grant-State	Grant to be awarded 8/75
14b	Continue operation of the NGP air quality network thru 6/76 - SD	10,000	103 Grant-State	Grant Awarded
15a	Establish and Operate an Air Quality Monitoring System Consisting of 9 Particulate, 4 SO_2, and 5 NO_x Stations thru 6/76. - UT	37,000	103 Grant-State	Grant to be awarded 8/75
16b	Continue Operation of Present Air Quality Monitoring Network Plus Additional Stations thru 6/76. - WY	55,000	103 Grant-State	Grant Awarded
17a	Continuation of air sampling at the existing state monitoring station at Colstrip	50,000	103 Grant-State	Grant Awarded
18a	Purchase of Meteorology Equipment	8,923	P.O.	Equipment Ordered
18 b,c (WA 75R380)	Pilot balloon observations and measurement of vertical temperature profiles in the Rocky Mountain Prairie Region	?	RFP	Proposals due 7/24
18d	Cost overun for FY'74 Meteorology Contract	4,500	Contract Amendment	Contract No.68-01-2921
19a (WA 75R379)	Measurement of background visibility in the Northern Great Plains.		RFP	In Contracts

* Estimated Cost

STATUS OF FY'75 PROJECTS

Reference No.	Description	Amount	Source	Status
21a(WA 75R349)	Design a system to track the development of energy fuels in Region VIII.	*$	RFP	All proposals received
22a (WA75R355)	In situ testing of the effects of flow changes on key ecosystem components in a selected reach of the Tongue River, Montana. Study results will have general applicability to all warm water ecosystems within the region.	25,418	RFP	In Contracts Begin Cost Eval.
23a (WA75R352)	Identify and calibrate a steady state water quality systems model to predict impacts of energy development on the quality of surface waters in the region.	*	RFP	In Contracts
23b	Support to principal contractor in development of energy-related water quality model (23a)	6,161	104 Grant-State	Grant Awarded
24 (WA75R459)	Develop a manual of construction source non-point pollution predictive techniques and prevention/control technologies for energy areas.	*	RFP	In Contracts
26a	Collect geochemical data in the Piceance Creek Structural Basin to permit predictive modelling of oil shale impacts - CO	24,000	IAA-USGS	Funds Transferred EPA to USGS
26b	Assist with collection of input data to a digital model of the Piceance Creek Basin to predict impacts on water resources from oil shale development. - CO	20,000	IAA-USGS	" " "
26c	Reconnaissance geohydrologic and geochemical information in the coal area of northwestern Colorado to predict impact of mining on the shallow ground water and surface water systems- CO	20,000	IAA-USGS	" " "

*Estimated cost

STATUS OF FY'75 PROJECTS

Reference No.	Description	Amount	Source	Status
27a	Quantify shallow ground water discharge to the Tongue River both physical and chemical - MT	$ 15,400	IAA-USGS	Funds Transferred EPA to USGS
27b	Investigation regarding the possibilities of coal mine spoil material contributing salts to the shallow ground water. - MT	2,495	P.O. to MSU	Work underway
27c	Baseline geohydrologic data pertinent to the potential impacts of surface mining of coal in the northern Yellowstone and Missouri River drainages of Montana	22,600	IAA-USGS	Funds Transferred EPA to USGS
28a	Continue chemical measurements of the shallow ground water system near Gascoyne, as mining expands	11,000	IAA-USGS	" " "
29a	Collect Geochemical Data in the Uintah Basin of Utah for Predictive Modelling.	20,000	IAA-USGS	" " "
29b	Collect geochemical data in Southern Utah	25,000	IAA-USGS	" " "
30a	Detailed Hydrologic and Geochemical Data from area of principal shallow coal resource north of Gillette, WY to evaluate potential impact of surface mining on water resource.	21,000	IAA-USGS	" " "
31a (WA 75R393)	Quantify the amount of flared gas and escaping pollutants from oil and gas wells in Utah and Colorado		RFP	In Contracts
32a (WA 75R348)	Estimate air pollutant emissions from coal gasification and oil shale conversion facilities		RFP	Proposals reviewed; contract being negotiated
34a (WA 75R367)	Measurement of trace element concentrations from fuel combustion from power plants.	113,000	RFP	Proposals due 7/25/75
33c	Supplies for emission spectrograph	1,000 P.O.	S&A	S&A purchase during FY 76

STATUS OF FY'75 PROJECTS

Reference No.	Description	Amount	Source	Status
36a	Modification of existing contract for additional trace element analysis	12,024	Contract Amendment	Contract Amended
36b	A literature survey of the toxicity of trace elements	0	RTP	Reg. VIII Technical Coordinator
37a	Impacts of coal development activities on the Tongue River Reservoir(physical,chemical & biological)	23,910	104 Grant-State	Grant Awarded
38a(WA 75R394)	Health impacts of environmental pollution in energy impacted communities		RFP	Proposals due 7/16/75
38c (WA75R460)	Develop economic impact projection models for the Fort Union Coal Region	10,365	Grant-NDSL	Under negotiations
38d (WA75R454)	Develop a handbook for rural communities, counties, etc. which address orderly growth and environmental management choices related to development of energy and mineral resources	85,000	RFP	In Contracts
39a,b	Fugitive dust survey		NERC Cinc.	Reg. VIII Tech. Coordinator
40-50(WA75R458)	Evaluation of community water supplies in energy impact areas	50,000	RFP	In contracts
51-61	Evaluation of community solid waste disposal facilities in energy impact areas	65,000	Grants-States	Grants awarded to WY and MT
62a	Develop Phase I air quality maintenance plans	60,000	Contract Modification	To contracts

STATUS OF FY'75 PROJECTS

Reference No.	Description	Amount	Source	Status
63a	Develop Phase II air quality maintenance plans	$230,000	RFP	In Contracts
63b (WA75R524)	Regional air quality diffusion modeling	[illegible]	RFP	In Contracts
64a (WA75R455)	Establish comprehensive community noise control program(s) in communities impacted by energy-related growth in Colorado.	15,000	RFP-CO	Under negotiations
64b (WA75R456)	Establish comprehensive community noise control program(s) in communities impacted by energy-related growth in Montana.	15,000	RFP-MT	Under negotiations
64c (WA75R457)	Establish comprehensive community noise control program(s) for communities impacted by energy related growth in North Dakota.	15,000	RFP-ND	Under negotiations
65a (WA75R451)	Evaluate the effectiveness of federal comprehensive multi-resource development planning.	30,000	RFP	Proposals being received
66	Participating in a larger effort to quantify the economics of industrial options for producing electricity, gas and oil.	20,000	IAA-CEQ	IAA signed

*Estimated cost

APPENDIX E

REGION VIII ENERGY RESOURCES

Energy Resources

The Region VIII States of Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming are being cast into a position of being a potential vast supplier of the Nation's energy needs. Environmentally sound development of these resources must be insured by State and Federal agencies.

Coal is the Region's most economically exploitable energy resource. Over fifty percent of the Nation's resources, almost fifty percent of the reserves, and more than sixty percent of the strippable reserves are located in the Region VIII States. The Region supplied slightly over seven percent of the Nation's 1973 coal production. Coal will be looked at in the future to supply electricity, synthetic natural gas, and synthetic liquids.

Shale oil may be a future supplier of petroleum products. Essentially all of the Nation's shale oil reserves are located in the Region's Green River Formation. A one million barrel per day industry has been estimated by some government officials. This level of development would supply about five percent of our present consumption of petroleum products.

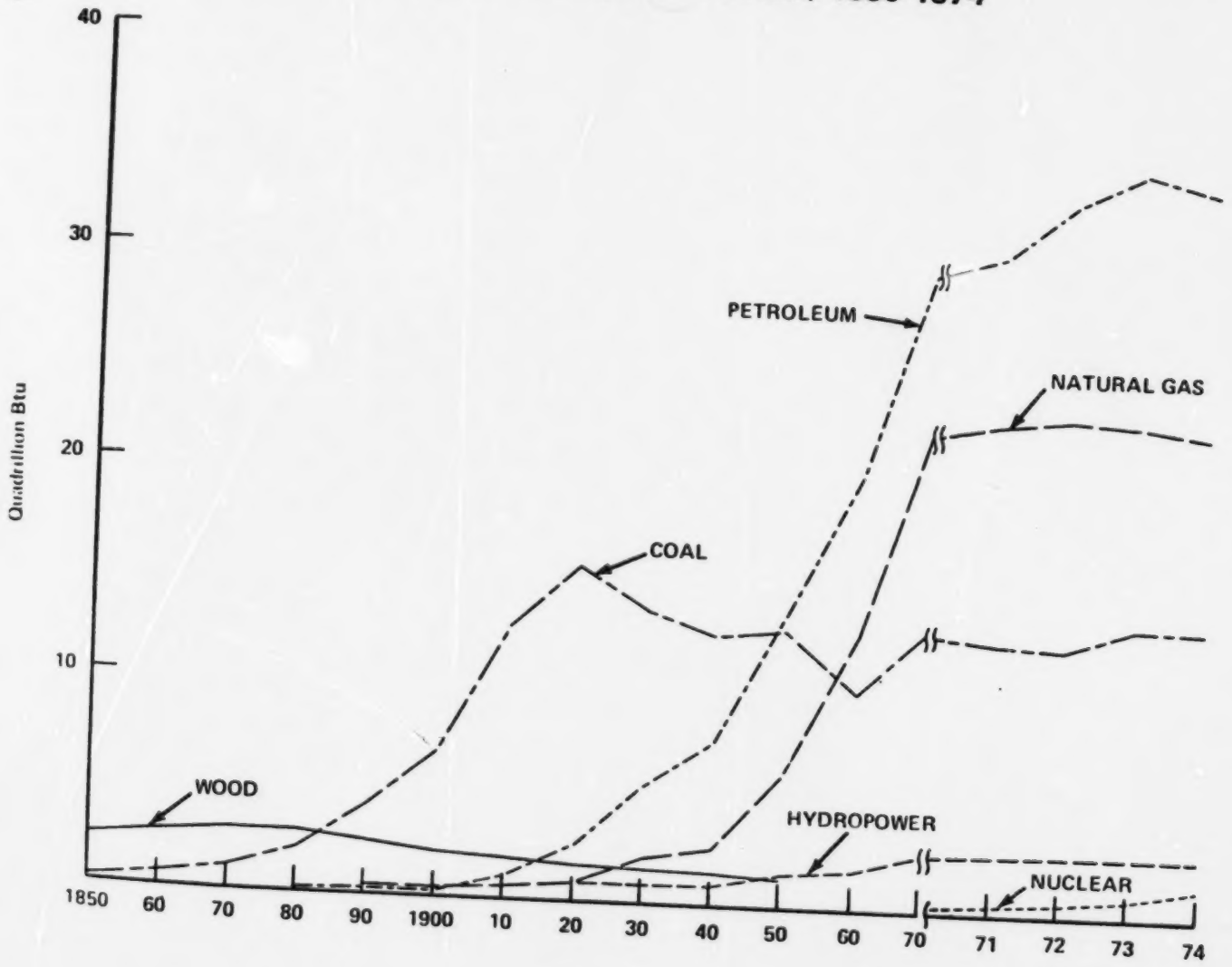
Production of oil and gas in the Region is expected to increase slightly. The Region contains about five percent and four percent of the Nation's oil and gas reserves, respectively. "Tight gas" resources in the Region are about two and one half times the known conventional gas reserves.

If the predictions by ERDA of a nuclear industry satisfying twenty-five percent of the Nation's electricity demands by the year 2000 materialize, the Region's uranium reserves will be called upon to supply a major portion of the requirements. The Region contains over forty percent of the Nation's uranium ore reserves and it produced almost sixty percent of the Nation's 1973 uranium ore output.

Some increased utilization of the Region's water resources for hydroelectric power is projected. Geothermal leasing and development activities are increasing in the Region placing the States second only to the West Coast area in geothermal development. High rates of solar insolation present an attractive potential energy resource to the Region. Utilization of wind energy is in the research and development stage. Above average wind speeds in the Great Plains region offer a potential energy resource.

The general geographical areas of energy resource locations are depicted on maps on the following pages. Also shown are statistical figures which attempt to place the Region's energy resource development potential in perspective to that of the Nation.

U.S. Energy Consumpti Trends, 1850-1974



Source: Historical Statistics of the United States, Bureau of the Census; U.S. Bureau of Mines.

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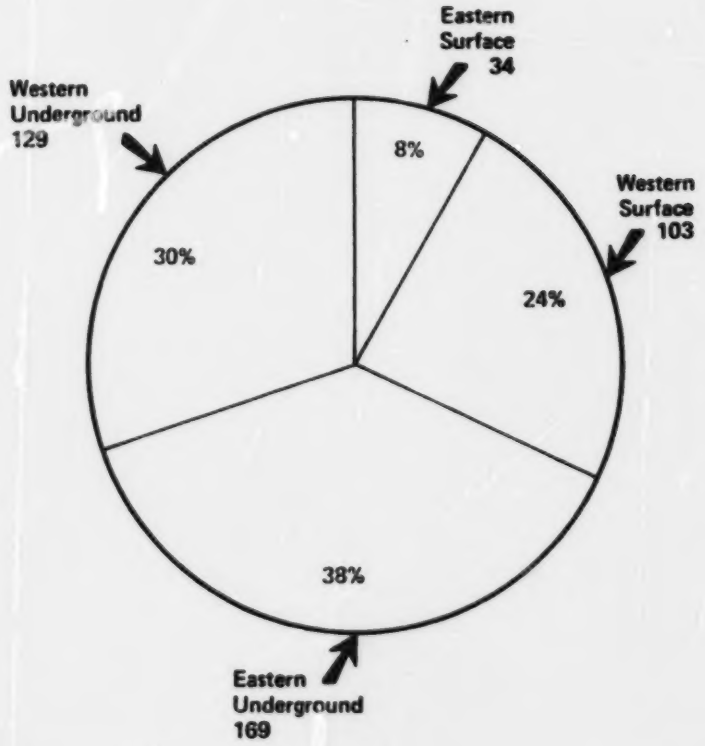
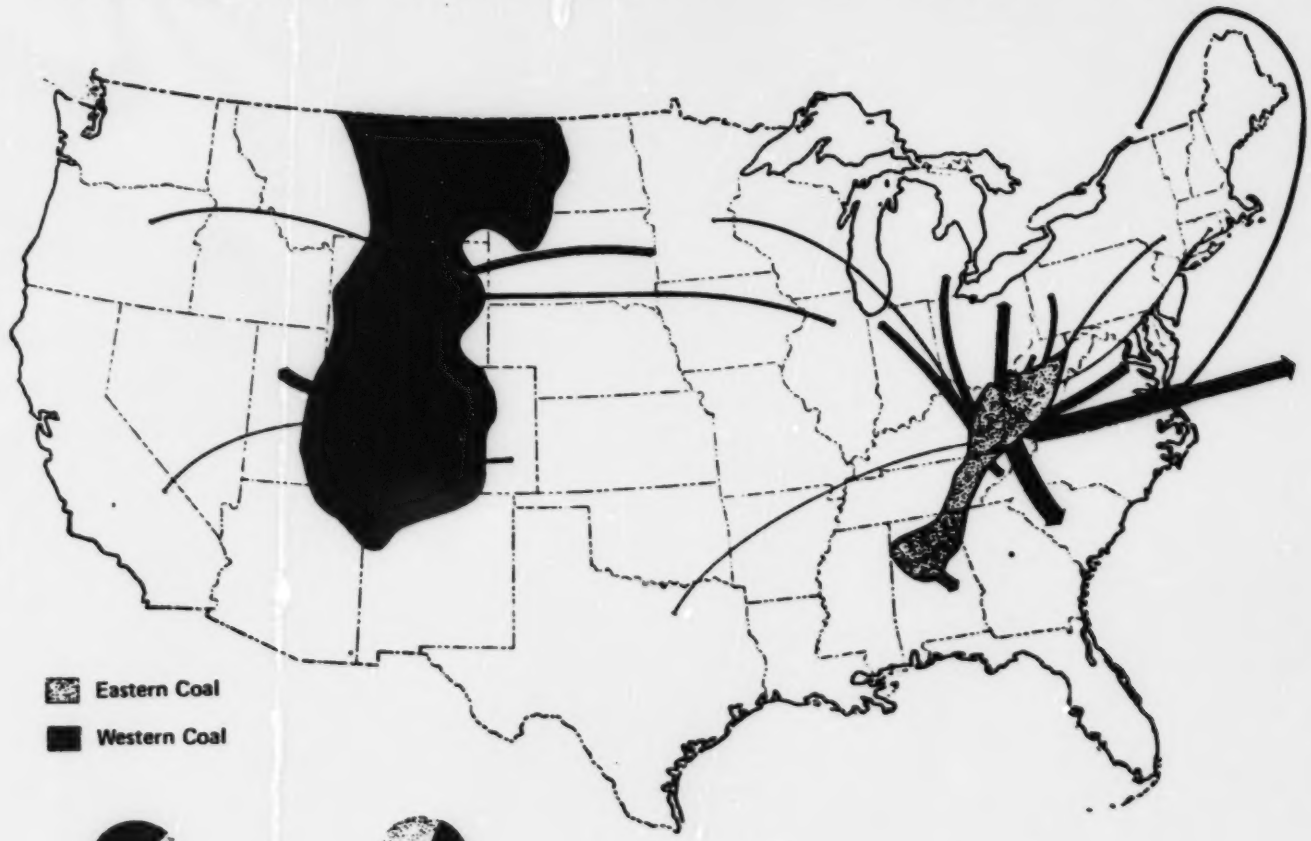
U.S. Demonstrated Coal Reserve Base, January 1974

(Billions of Short Tons)

TOTAL: 434

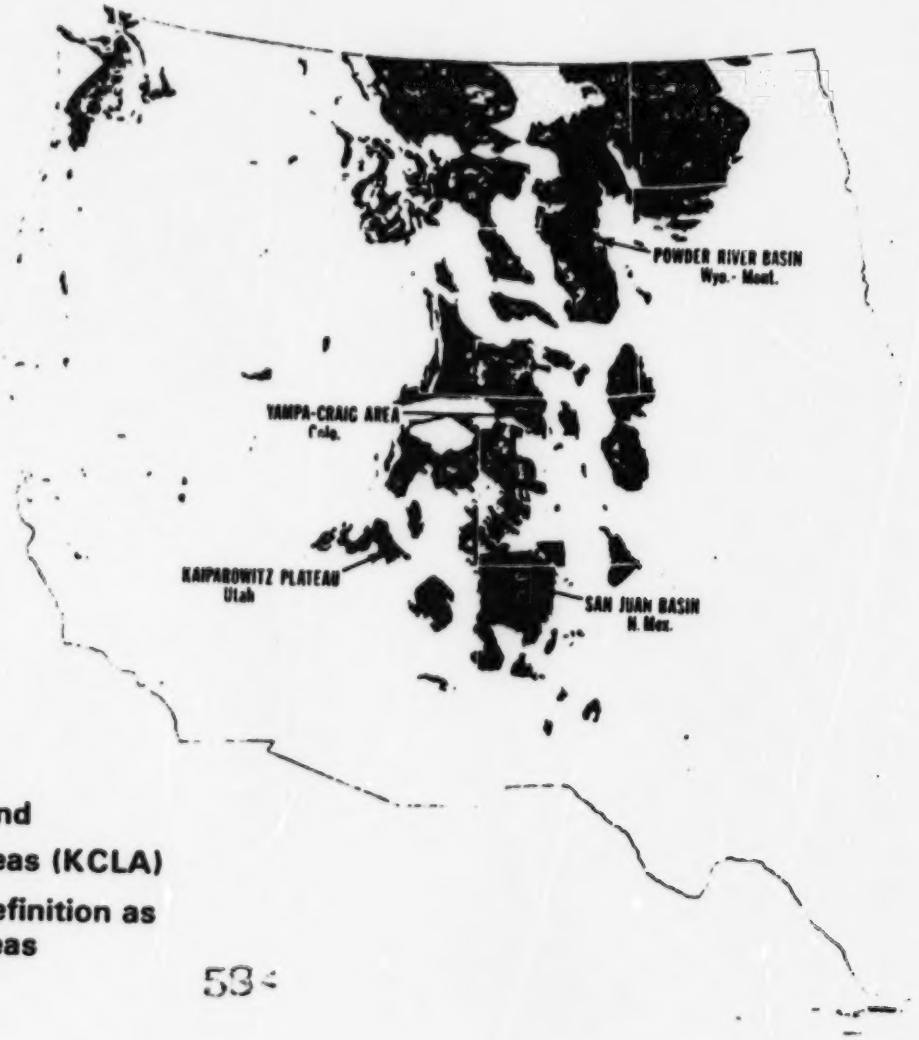


U.S. Low-Sulfur Coal Reserves, Production, Distribution, 1973

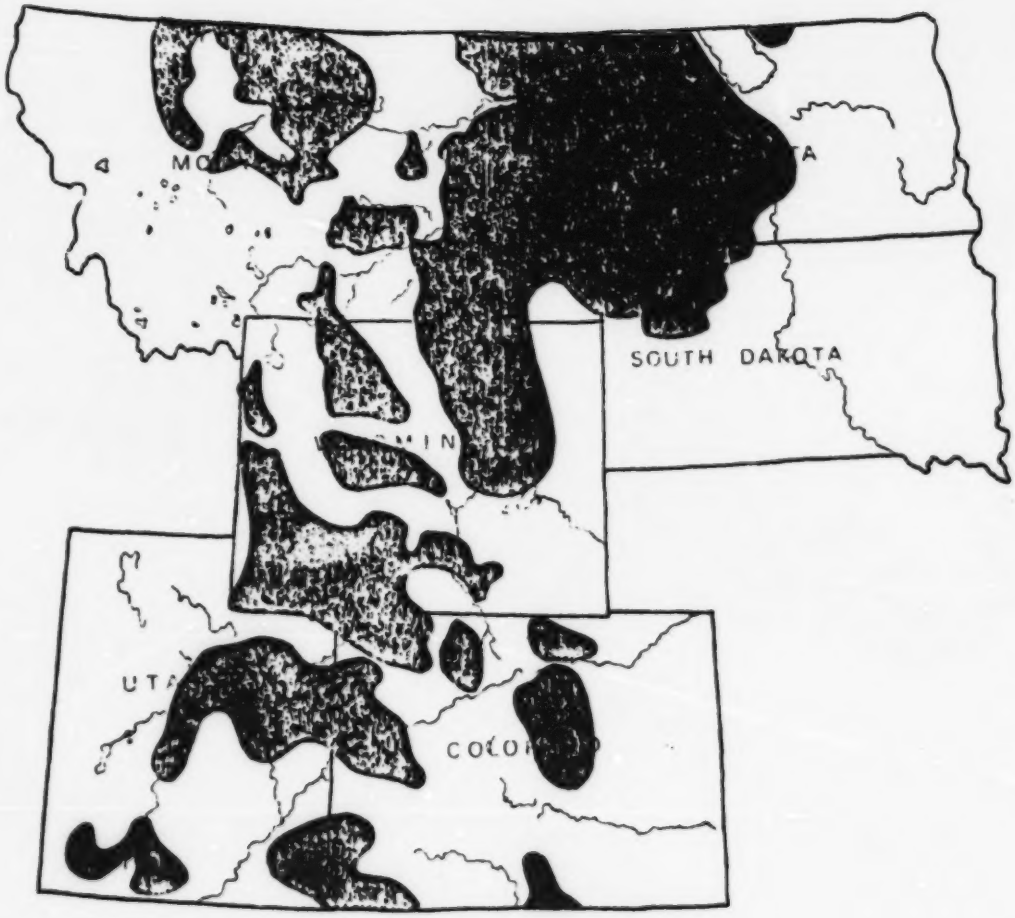


Source: U.S. Geological Survey, 1974.

Known Federal Coal Leasing Areas for Competitive Bidding



- Prospective Valuable Land
- Known Coal Leasing Areas (KCLA)
- • Areas under study for definition as Known Coal Leasing Areas

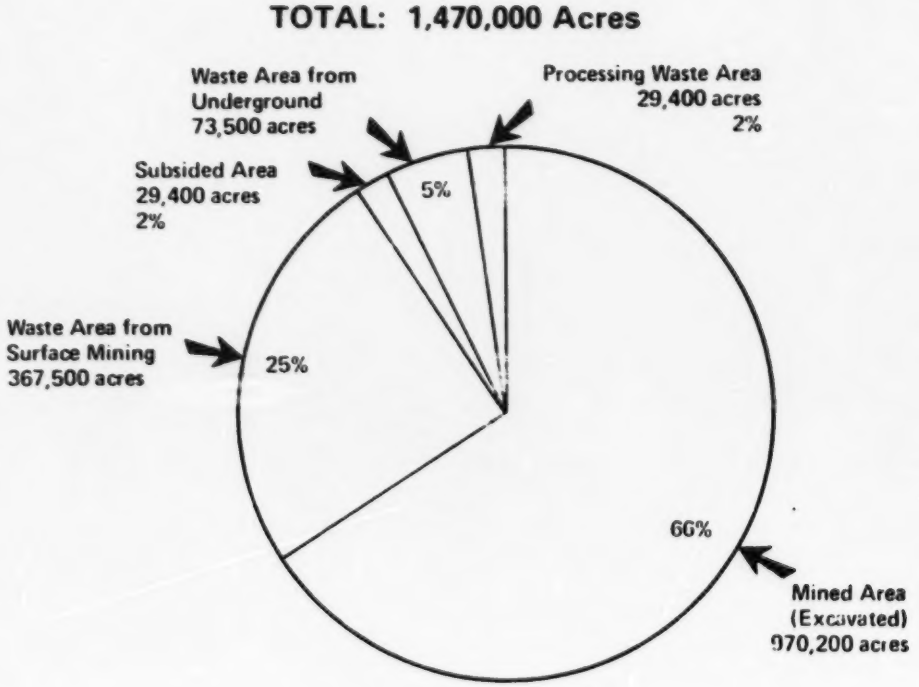


General Location of Coal Resources in Region VIII States

COAL

• 1973 Coal Production -- United States	592 Million Tons
• 1973 Coal Production -- Region VIII	44 Million Tons
• Total Coal Resource -- United States	3,200,000 Million Tons
• Total Coal Resource -- Region VIII	1,620,000 Million Tons
• Total Coal Reserves -- United States	434,000 Million Tons
• Total Coal Reserves -- Region VIII	194,300 Million Tons
• Total Strippable Coal Reserves -- United States	137,000 Million Tons
• Total Strippable Coal Reserves -- Region VIII	83,800 Million Tons

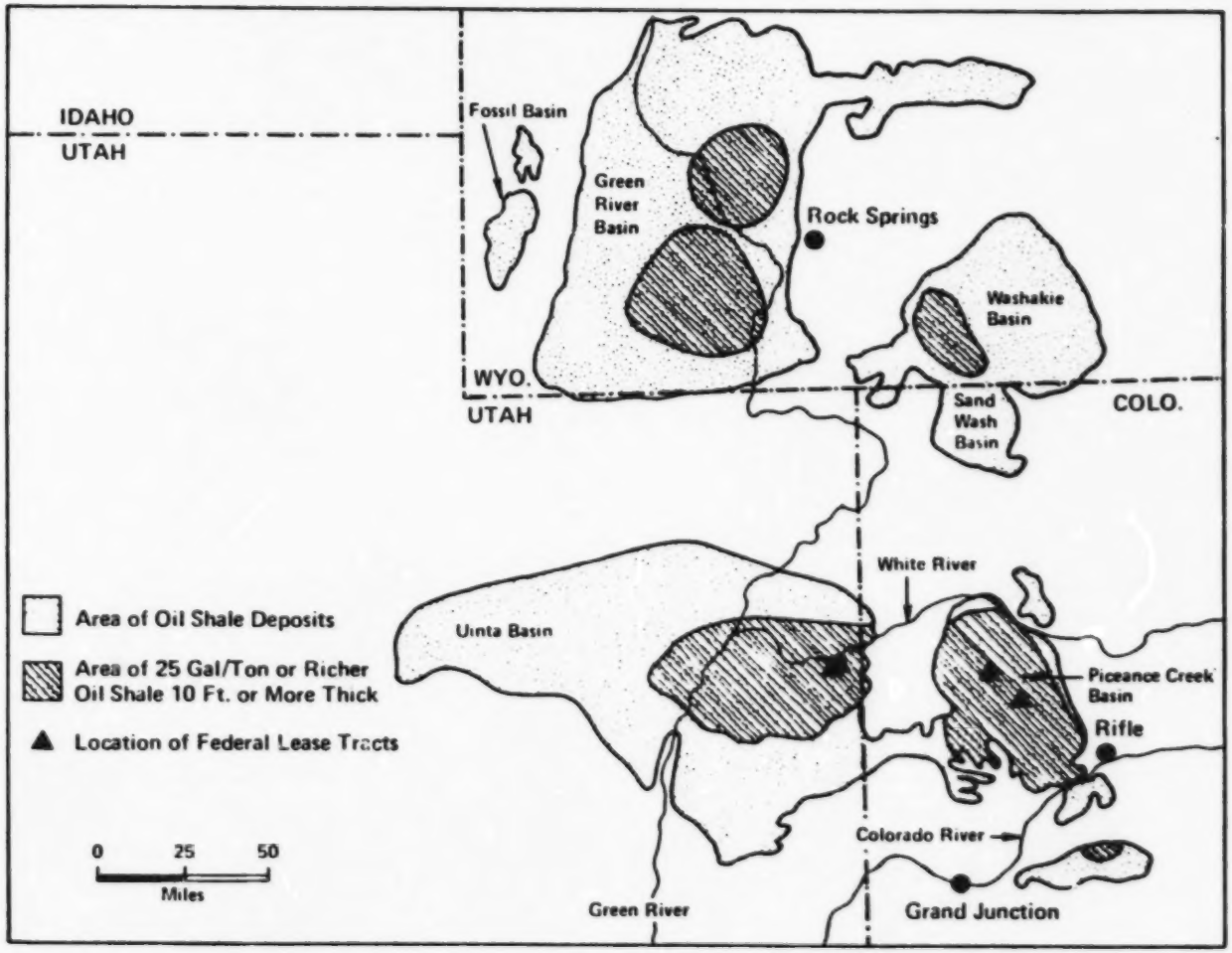
Cumulative Land Use, Bituminous Coal Mining, 1930-71



Source: IC 8642, Land Utilization and Reclamation in the Mining

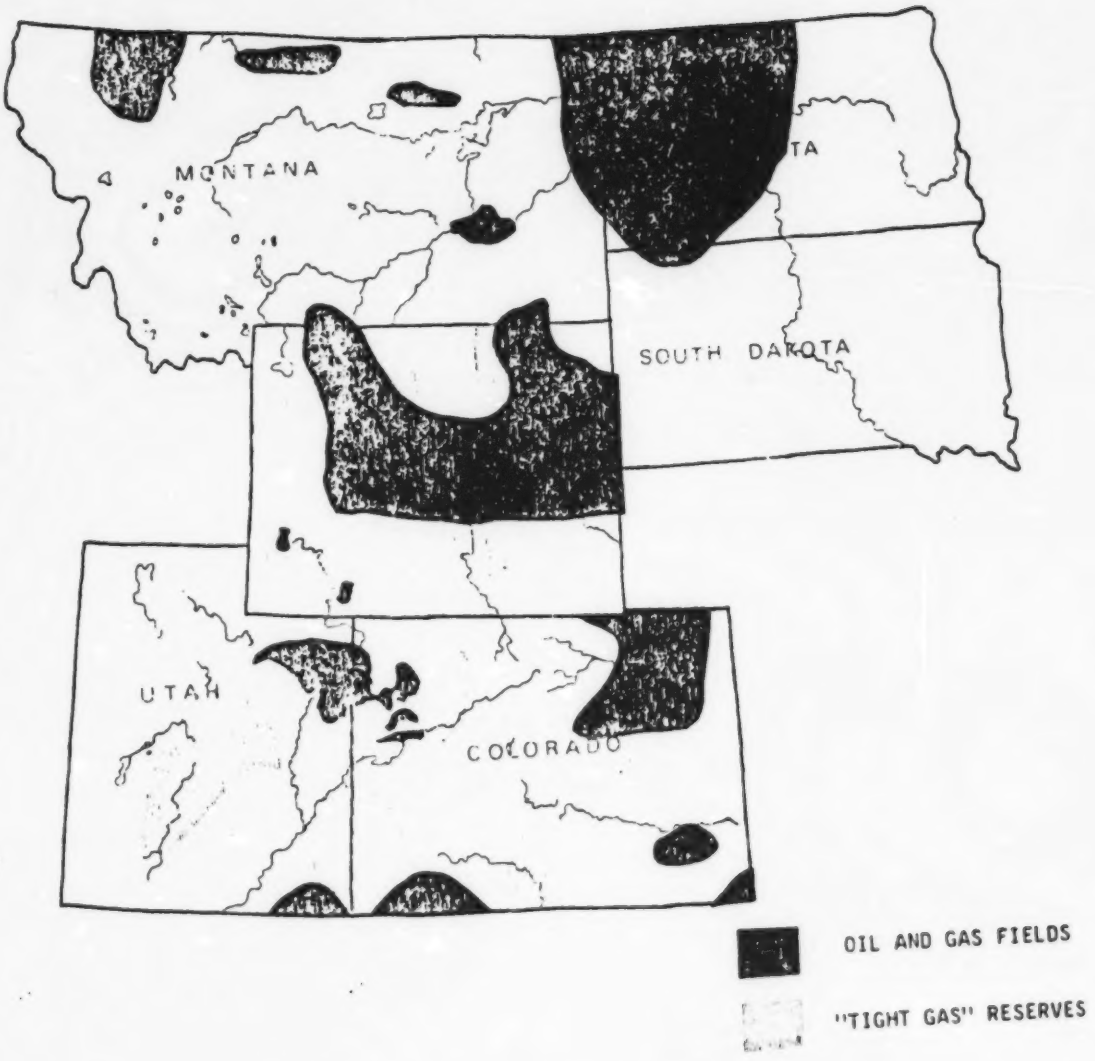
General Location of Oil Shale
(Kerogen-Rich Marlstone)
Resources in Region VIII States

U.S. Oil Shale Deposits, Green River Formation



OIL SHALE

• 1974 Annual Oil Shale Usage -- United States	Negligible
• Total Oil Contained in Marlstone of Green River Formation	4 Trillion Barrels
• "Economically Recoverable" Reserves of Shale Oil	600 Billion Barrels
• Total Surface Land Area Involved Over Oil Shale Deposits (Not Including Disposal or Spent Shale)	16 Million Acres



General Location of Oil and Gas
Reserves in Region VIII States

OIL AND GAS

• 1974 Usage of Crude Oil -- United States	6.3	Billion Barrels
• 1974 Production of Crude Oil -- United States	3.8	Billion Barrels
• 1974 Reserves of Crude Oil -- United States	34.25	Billion Barrels
• Estimated Reserves of Crude Oil -- Region VIII	1.9	Billion Barrels
• 1974 Natural Gas Production -- United States	21.3	Trillion scf
• 1974 Reserves of Natural Gas -- United States	237.1	Trillion SCF
• Estimated Reserves of Natural Gas -- Region VIII	10	Trillion SCF

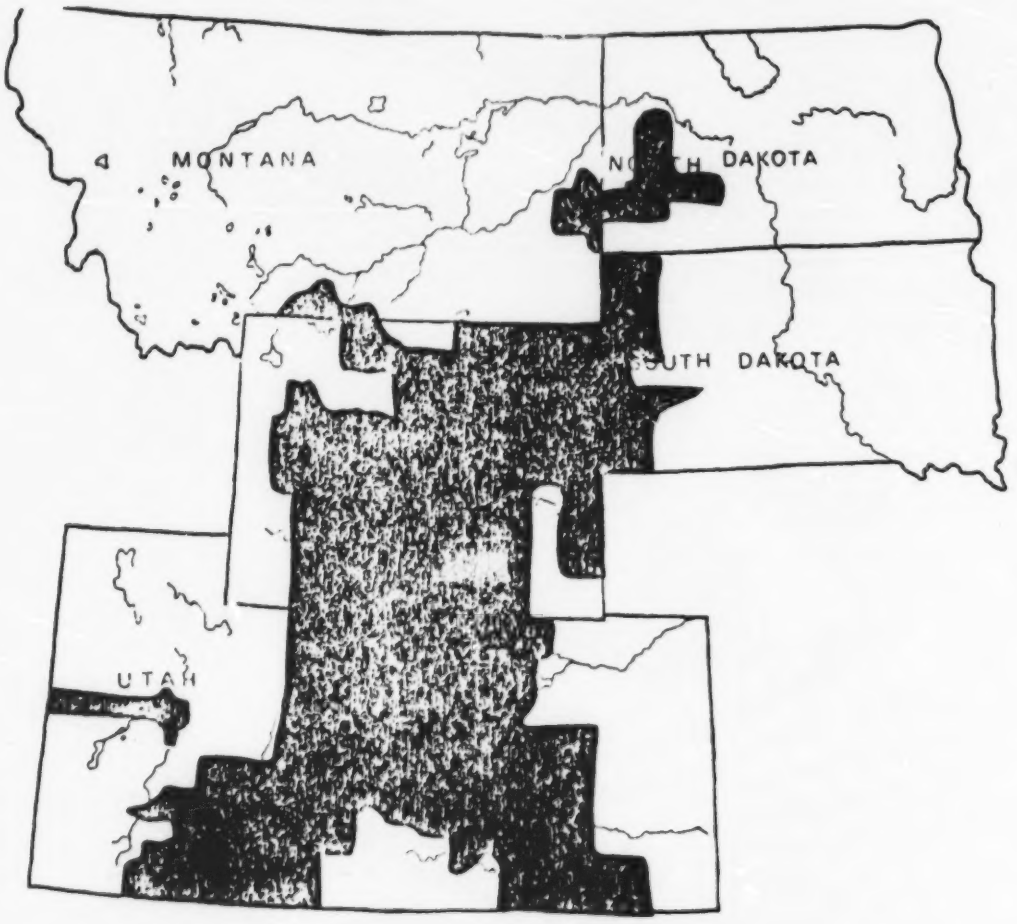
"TIGHT" GAS

- Present Annual "Tight Gas" Production -- United States -- Negligible

- "Tight" Gas Resources -- Region VIII

	Trillion Cubic Feet
* Green River Basin, Wyoming	240
* Piceance Creek Basin, Colorado	210
* Uinta Basin, Utah	150
* Total	600

- Conventional Gas Reserves -- United States 237



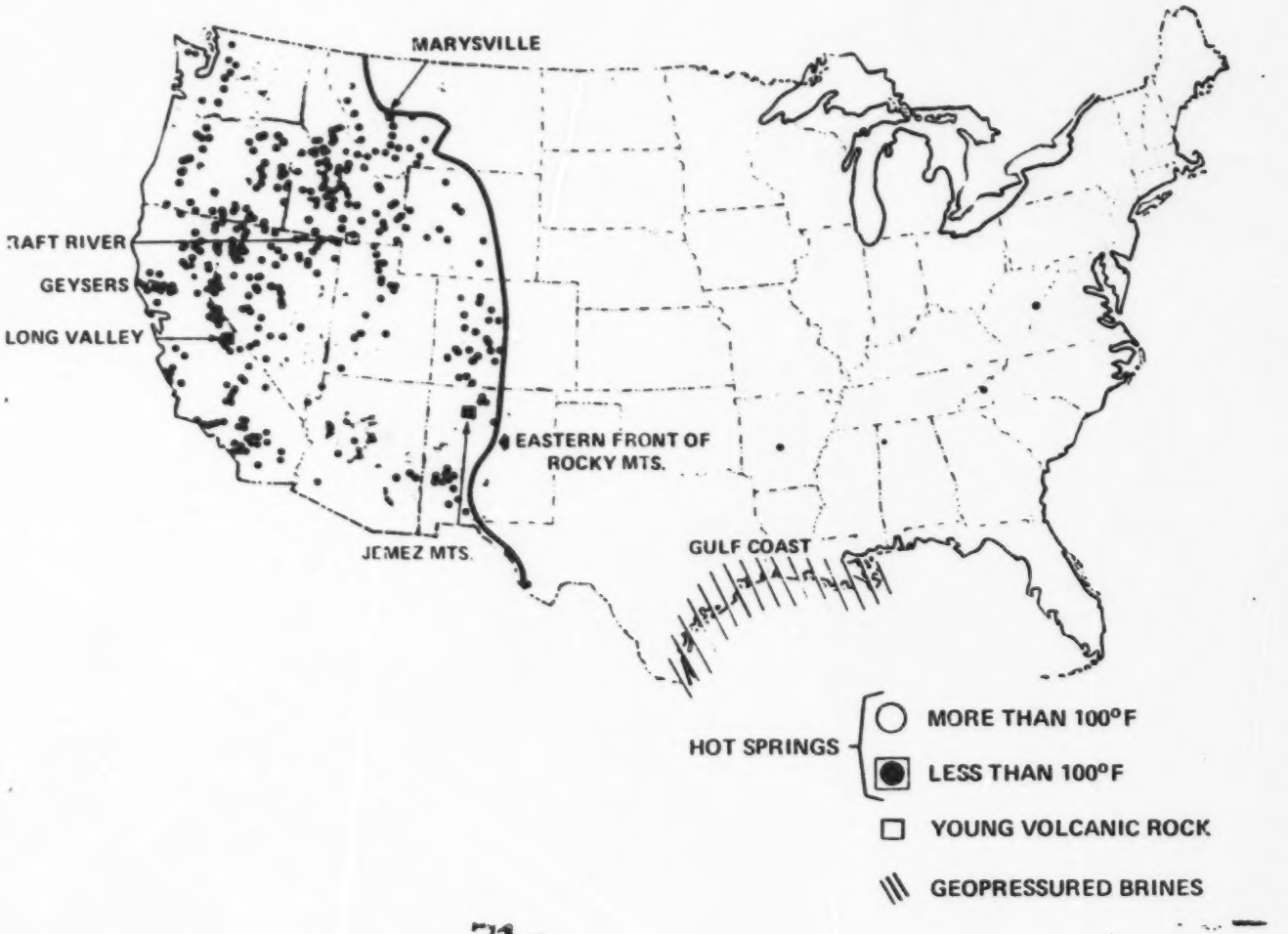
General Location of Uranium
Reserves in Region VIII States

URANIUM

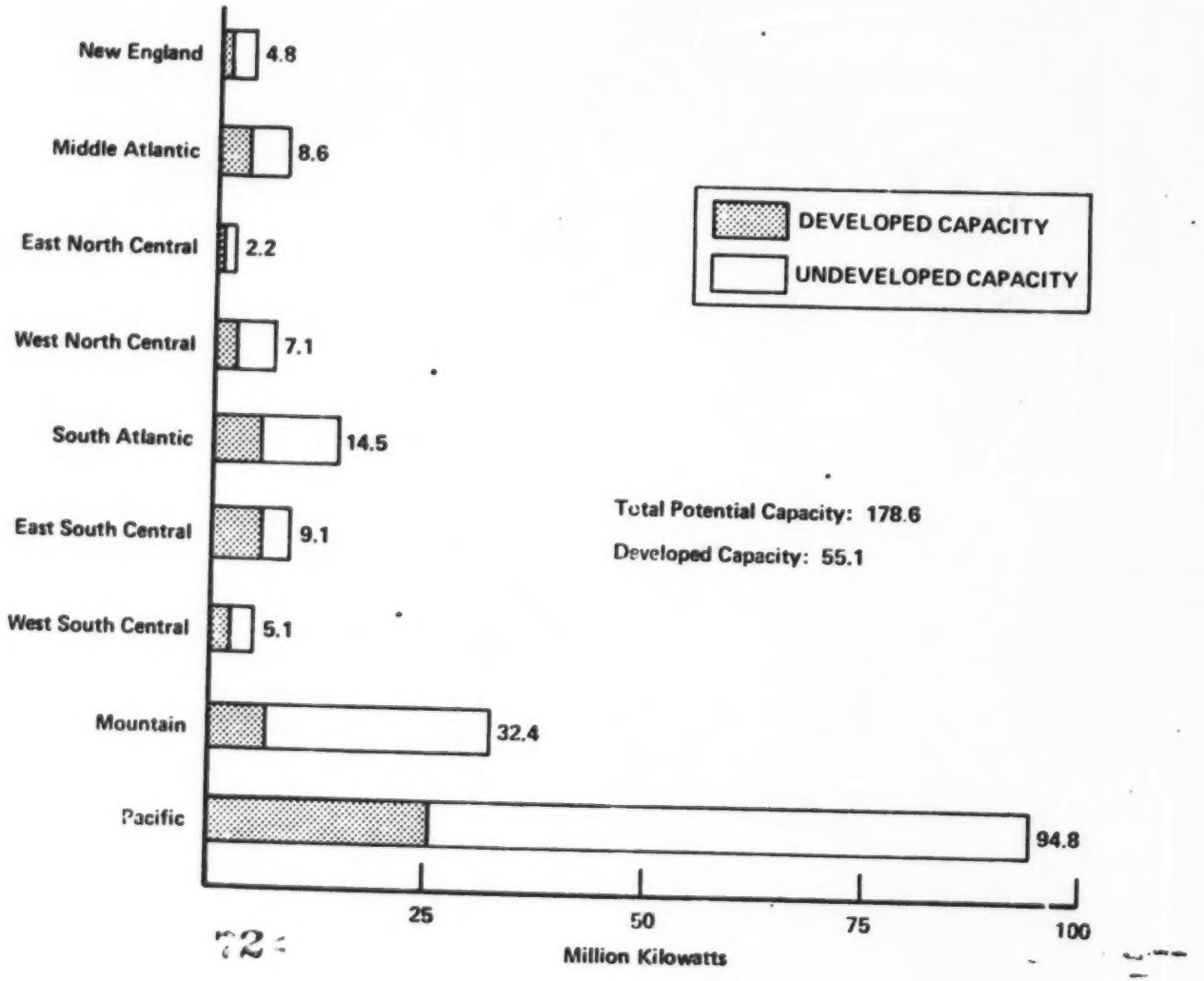
• 1974 Uranium Ore Reserves -- United States	315,000 Tons
• 1974 Uranium Ore Reserves -- Region VIII	131,000 Tons
• 1973 Production of Uranium Ore -- United States	6,800,000 Tons
• 1973 Production of Uranium Ore -- Region VIII	3,900,000 Tons
• Land Held for Uranium Mining & Exploration -- United States	19,000,000 Acres
• Land Held for Uranium Mining & Exploration -- Region VIII	13,000,000 Acres
• 1973 Uranium Production -- United States	13,800 Tons

General Location of Geothermal
Energy Potential in Region VIII States

U.S. Geothermal Resources, Areas of Promise



U.S. Hydroelectric Power by Region, 1973



U.S. Energy Facility Production Lead Times